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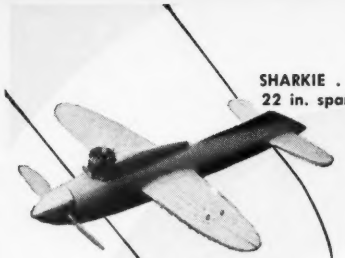
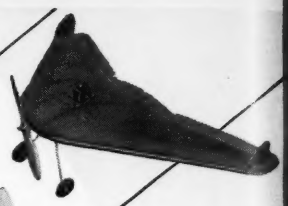
KANGAROO BOMBER CARRIES FIGHTER IN ITS POUCH

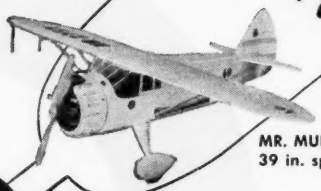
First Color Photos of New Jet Trapeze Plane

WEDGIE . . . . . Plan No. 382
27 in. span, for .19 to .29 engines

SHARKIE . . . . . Plan No. 377
22 in. span, Class VI, .60 engines





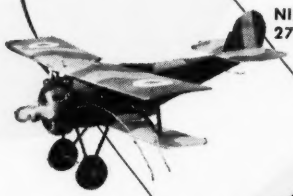


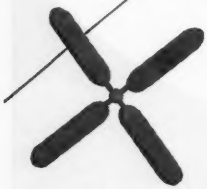
MR. MULLIGAN . . . Plan No. 374
39 in. span, for .29 to .65 engines

a sure hit!

NIEUPORT SCOUT . . Plan No. 379
27 in. span, for .099 to .30 engines

HUGHES RACER . . . Plan No. 381
25 in. span, for .29 to .65 engines





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40 in. span, for .099 engines

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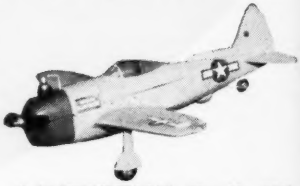

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20 in. span, for .099 to .29 engines

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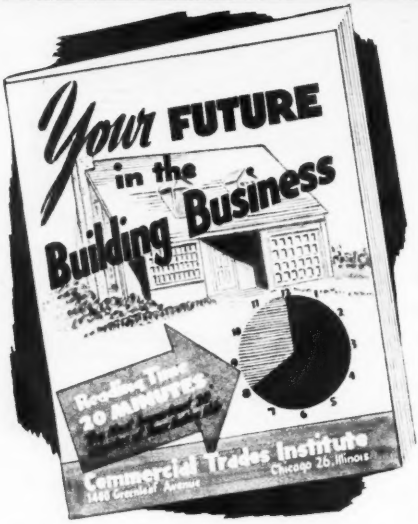

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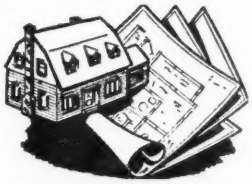

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INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

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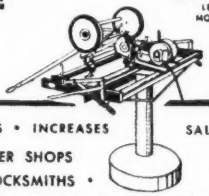

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If an inventor believes he has an invention, a search of the most pertinent prior U. S. patents should be made and a report obtained relative to its patentability. Where such report indicates that the invention appears patentable, in order to secure protection, diligence should be exercised in making application for a patent.

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YOUR INVENTION CLINIC

Conducted by Joseph H. Kraus

ATTENTION, INVENTORS: As a means of broadening the scope of Your Invention Clinic and enabling this department to provide for its many thousands of readers an even greater amount of practical information about inventions and inventing, we are discontinuing the individual letter-answering service with this issue. Instead, Mr. Kraus each month will write a full-length article dealing with some specific problem or field of information which he feels to be of vital interest and importance to inventors and would-be inventors. His first article will appear in this space in the July issue. Watch for it. We believe that it, and each succeeding article in the Your Invention Clinic series, will be a gold mine of helpful advice and stimulation.

Replacing a Clothesline

Wilfred J. Charette of Centredale, R. I., has figured out a way to replace clotheslines without climbing the pole. He wants to know if he could sell instructions for his system.

ANSWER: This is merely a simple household hint and therefore cannot be protected. Once some company printed the instructions, anyone else also could describe how to do it (in different words, of course) and the idea would become public property. The best thing you can do with your instructions is to submit them to a magazine for publication. If the magazine likes your scheme, you may get a few dollars for a good tip to housewives and the satisfaction of becoming a published author.

Soup Skimmer

A. Schmeiler of Byram, Conn., sends drawings of a spoon for skimming fat from soup or gravy. He has applied for a patent on his invention.

ANSWER: Though there are many different styles of spoons on the market that do the same thing, you should find a ready sale for a really handy soup skimmer. Your spoon appears to be superior to the current types of skimmer but will be harder to keep clean.

Since you are able to manufacture the article yourself, we recommend that you evaluate the costs for small-scale production. Estimate the number of skimmers you would have to sell to cover the costs of materials and tooling. Allow yourself a fair margin of profit, then set your retail price 60 to 80 per cent higher than your production cost. If housewives buy your skimmer at this price, you will soon know whether you will make money with your idea—or lose your shirt.

When you really get into production, the basic price will drop. On the other hand, samples, shipping, advertising, office, manufacturing and other costs will rise and take up most of your paper profits from the lowered production costs. But the idea is well worth pushing, in our opinion.

After setting up your own system for turning out skimmers, you then could submit your patent to other concerns for possible sale. If some large, well-rated company will guarantee you an income, you probably would do better to let that firm take over the production and sale of your product. But you should insist on an iron-clad guarantee of minimum funds plus royalty.

Mechanical Newsstand

A. Wojciechowski of Toronto, Canada, asks for advice about newspaper vending machines before he starts spending his time and money on a model for a mechanical newsstand.

ANSWER: Every inventor should make a search for patents on articles similar to his idea. The average search costs so little that only the simplest construction requiring the least amount of time can be fashioned for less than the cost of a search.

Many styles of newspaper vending machines have been patented. Few are on the market because a mechanical newsstand needs an attendant to stock it, collect the revenue and make repairs. Also, unless the machines are very tall and available in almost endless array, they would limit the number of items that could be handled.

Even a small "nonmechanical" newsstand can do better. Because papers vary in thickness from day to day, and even from edition

[*Continued on page* 16]

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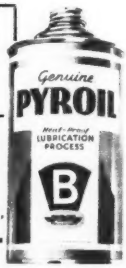

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Your Invention Clinic

[*Continued from page* 14]

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There should be a market for a perfect paper vender. But that ideal machine must load almost instantly, make change, handle a large variety of publications, give each a good display—and still be small and compact. Unless you are sure you can meet all those demands, better forget about your mechanical newsstand.

Measuring Trammel

Lyman Wenger of Grand Rapids, Mich., submits blueprints for a measuring trammel on which a patent is pending. He wants us to tell him the value of his invention.

ANSWER: No invention is worth the cost of the paper on which the patent application has been prepared until that invention is sold. It makes little difference to whom the sale is made.

So, first, you must assume that you can sell someone either the patent or the production of your item. Perhaps you can sell the patent outright. In this case you will make some money, even if nobody ever manufactures your article.

Some of the patent claims may be valuable to a company as a support for other products that it makes. The company may want to hold your trammel design for future expansion, or to protect another instrument that may have some feature similar to yours. Or the firm may want to buy up your rights simply to eliminate competition from a new instrument on the trammel market.

You could manufacture, or have manufactured for you, the article on which your patent is pending. Here, again, there are dozens of ways to handle the situation. Then, too, you can distribute the item or have it distributed on commission or by contract.

Or you could submit the plans to an organization which may be in a better position than you to get more money or make a good deal. Perhaps the best of these are the organizations that can sense the value of your invention and will charge nothing but commission upon sale for contacting the interested parties. But this does not always follow, either. Some companies make a blanket charge for handling

[*Continued on page* 22]

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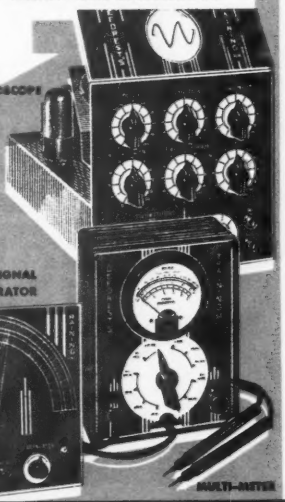

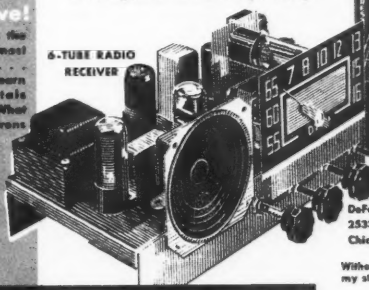

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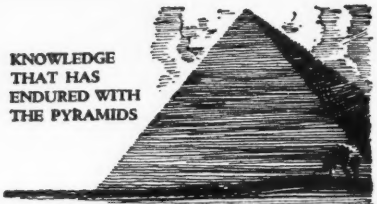

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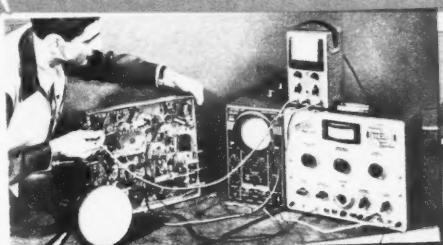

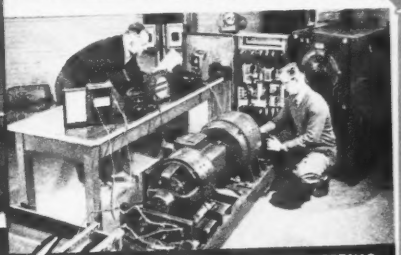

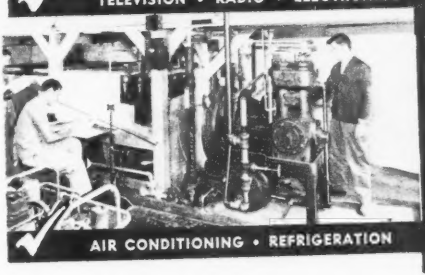

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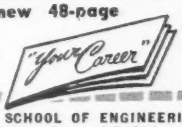

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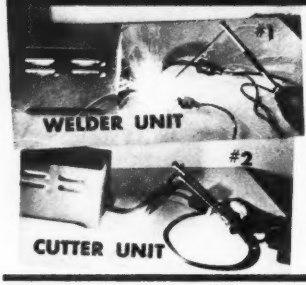

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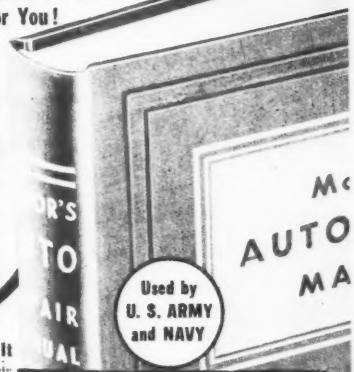

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But no matter what course you finally follow—have your own lawyer examine any contract you make. Remember that until you do *sell* your idea, your patent is relatively worthless. But if it clicks, you should share in the benefits. Until you make a satisfactory deal, be sure you keep full control of your grant.

Hunting Rose's Metal

L. C. Lares of Duluth, Minn., says that he has been hunting in vain for information about Rose's metal. He also asks why the manufacturer of the metal labels it "For Technical Use Only."

ANSWER: Rose's Alloy is one of many alloys that fuse easily. It consists of two parts, by weight, of bismuth and one part each of tin and lead. It melts at 200 degrees Fahrenheit —12 degrees lower than the boiling point of water.

There are many alloys with much lower melting points than this. For example, Darcet's Alloy, with its eight parts of bismuth, five parts of lead and three of tin, melts at 176 degrees F. But if you add only $\frac{1}{16}$th of a part of mercury to the molten mass, the melting point drops to 149 degrees F.

As far as we know, there aren't any patents on the formulas for making these alloys.

One of the reasons for the "Technical Use" designation comes from the fact that the formulas may vary slightly. The alloy therefore would not be pure enough for use in chemical tests. Another reason for "technical use" is the danger of metal poisoning if the alloy were utilized for any food container.

Hope this ends your long hunt for Rose's metal.

Cold Pack for Ice Cream

Carl W. McAllister of Palmyra, N. J., has designed a cold pack for carrying ice cream and other frozen goods. He wants us to comment on his idea.

ANSWER: Insulated bags already are available for handling ice cream. These bags have a quilted lining and are fairly flat. Still, distributors complain that the bags take up

[*Continued on page* 24]

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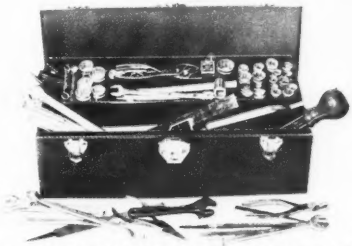

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Your Invention Clinic

[*Continued from page* 22]

so much storage room that there's no profit in handling them.

As a result, a dozen paper companies are trying to develop a better pack for ice cream. That unit must keep ice cream in good condition for several hours but take up little space and be both inexpensive and expendable.

A cold pack based on your design could be produced. It may not be a good idea to use the solution you suggest. We are mailing you a recommendation for a change. Even with this change, your article would still be expensive and little better than the insulated bag already on the market.

To use your cold-pack bag, you must leave it at the ice-cream store in the morning for refrigeration. Later you have to come back to the store to pick up the ice cream—an extra trip that nobody is going to like. The sales clerk makes only a single sale after waiting on you twice and the refrigerator works overtime to cool a lot of nonprofit empty bags. Your idea may keep the ice cream cold but it's a costly and time-wasting way of doing it.

The right answer to the cold-pack problem is not as simple as your proposal appears. An insulated quilt won't do, either. It takes up too much room, requires too much fussing in packing and costs too much. On the other hand, there's a big demand for a practical cold-pack. A good pack that would cost less than a nickel delivered could make a fortune for the inventor.

Christmas-Tree Lights

A. K. Anderson of Austin, Tex., sends a design for a lighting chain for Christmas trees.

ANSWER: Before you do anything else, have a search made to see whether you have a patentable invention. Tree-lighting chains do need improvement. But as in your design, when the improvement costs more money for extra wires and socket, you may have trouble selling both manufacturers and customers on the added expense.

Do some more thinking about less costly changes in your lighting chain. Improve the system, of course, but do a good job—not a half-way measure.

Electronic Organ

G. R. A. Tucker of Hamilton, Bermuda, is working on an electronic organ and wants us to evaluate his design.

ANSWER: You call your device an elec-

[*Continued on page* 28]

ON YOUR OWN

You know the feeling. You had it that time you "soloed" the family car. And again that day you shed the khaki blouse and shook the moth-balls out of the loudest get-up in your wardrobe.

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The Editor's Workbench

The chipper little nipper on the right is Mechanix Illustrated's newest editor. For biographical dope about him, read screed inscribed below.

New Editor Joins Staff

We are happy to announce that one of the most powerful brains and skilled pairs of hands this generation has ever known have become attached to the payroll of (y)our favorite magazine. The possessor of these mighty talents is none other than M. (for Mechanix) I. (for Illustrated, also Illustrious) Guy, who has joined the Crafts and Hobbies staff in the role of associate editor, technical advisor and general handyman. That's he (also him) up above.

M.I. Guy is farbenstroven-arbel years of age and was born in Swonkohw, U. S. A. After the customary childhood—during which he amused himself by inventing the telephone, electric light, automobile, radio, safety razor and the self-propelled jo-jo, and recovered from the mumps—he was graduated as a Phi Beta Kappa from M. I. T. (that's Mechanix Illustrated Tech) and entered upon his chosen profession of Genius, Senior Grade.

A lifelong reader of this magazine, Mr. Guy's brilliant letters to the editor were so filled with tidbits of wonderful information that we decided we couldn't get along without him. We hired him and put him right to work. Started him off easy, giving you craftsmen advice about turning a table lamp. You'll see the article on page 114 of this issue. And from now on, we'll all be seeing a lot of M.I. Guy in the Crafts and Hobbies section. As Shakespeare once wrote:

"He'll show you how, he'll tell you why,
So keep your eye on M.I. Guy!"

Build Yourself a Boat

Oldtimers in the MI family will remember Dorothy, a 24-foot motor sailer designed by the late, famous John G. Hanna. Hundreds of amateur boat-builders all over the world have constructed this craft from MI plans. Yes, Dorothy was one of the most popular gals we ever knew—but pretty soon she's going to have a serious rival, name of Dorena. Here's her story:

Because Dorothy was such a heart-breaker among fellows who love boats, we figured that a somewhat larger version, with improved cabin accommodations and more sailing ability, would be a happy design. So we commissioned the well-known naval architect Luther H. Tarbox to get out a 26-foot, up-to-date sailer modeled along Dorothy's lines.

Beginning next month we bring you the sloop-rigged Dorena, Dotty's kid sister. With her clipper bow and raking mast, she's a yachty-looking little hooker if ever we saw one. She has cruising accommodations for two and, in addition to her sails, has a 25-hp engine which can push her along all day at seven knots.

Dorena's beautifully drawn plans are the most complete we've ever printed in MI. Every last piece of equipment, down to and including the muffler, ventilation ducts and tanks, has been painstakingly engineered and detailed by Lute Tarbox. It's really something. Look for Dorena in the July issue.

More About That Dream Car

Dear Editor:

The letter from G. M. Bumpus in the April issue echoes my sentiments entirely and I'm sure the sentiments of a great portion of the automobile-buying public.

I have seen just about every offering the car manufacturers have marketed since the

[*Continued on page* 32]

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Your Invention Clinic

[Continued from page 24]

tronic organ but it apparently is a four-note affair that probably wouldn't make music even if it works.

It's hard to follow your technical analysis of the way you assume your invention will work. You have failed to show us any pattern of wave forms or a diagram for your circuit. Your discussion of the movements of stators is impossible to picture. The introduction of a Doppler effect, too, is confusing and appears to be useless. You also are introducing a number of items that bear little or no relation to each other and that would not help to create any harmonious sound.

There is a good demand for an inexpensive electronic instrument. But it must actually produce music, not discords.

We think you have designed nothing here worthy of protection.

Do It with Mirrors

John A. Mitchell, Jr. of Ashboro, N. C., suggests a new projection system that uses mirrors. He wants to know what we think of the idea and wonders if prisms could be used instead of mirrors to reduce the number of parts.

ANSWER: There are no particular advantages to be gained by using prisms instead of mirrors in your proposed setup. Your best bet would be to select the projecting lenses carefully, then use surface-coated mirrors. Any mirror with a coating on the back will give a double reflection. You can avoid this with a prism. Prisms, though, are more expensive than mirrors, take up greater space and weigh more. So, why not do it with mirrors?

Glass for Baby

Edward Gurski of Kearny, N. J., suggests a special glass to teach a baby how to drink from a glass.

ANSWER: Except for the threads on the container and the angle of the top, you have redesigned the practical joker's dribble glass. The contents dribble down on your shirt front and jacket when you drink from this glass. You'd have to prove that your glass would really help a youngster to drink from a glass. We feel strongly against teaching children by substitutes. If a youngster is old enough to learn to drink from a glass, he or she should be taught to do so properly.

Don't try to teach a growing child to use a substitute glass. When you first feed liquid to a baby from a glass, the baby bites the

[Continued on page 30]

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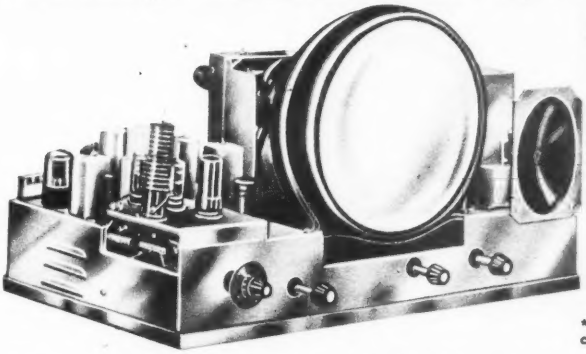

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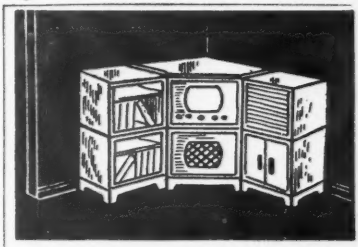

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Your Invention Clinic

[*Continued from page* 28]

edge. Your design will not prevent this nor help the transition from spoon or bottle feeding to the drinking glass. Therefore, we don't recommend any action on your idea.

Belt to Land Planes

Le Roy Work of Milan, Ill., suggests an endless belt as a runway to land planes. He also asks us about an idea for a clutch-pedal stop to keep the clutch mechanism on our automobiles from slipping.

ANSWER: Many inventors have assumed that a plane's ground speed is the important factor in bringing the plane to a quick stop. Therefore they have designed moving belts running at the plane's speed but in an opposite direction—just as you outlined in your letter.

This idea has no value. The important thing in landing a plane is the relative air speed. You could set a plane down at practically zero land miles per hour if you could bring the plane into a man-made head wind. But you'd have to control the speed of the wind so that it would correspond to the slackening speed of the plane. Otherwise, the plane would be blown away or upset.

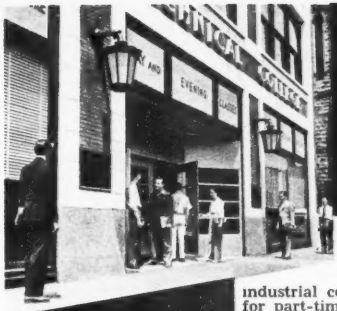
If you are in the habit of slipping your clutch, you should break yourself of that habit instead of designing a gadget that will help you overlook it. Furthermore, many clutches can be adjusted to do the job your device is intended to do. Besides, the friction clutch still found on a few cars probably will be completely abandoned by car makers before you could get any patent protection. We suggest that you forget the whole thing.

Exploding Turbine

Judson Bennett of Youngstown, O., has designed an internal-combustion turbine.

ANSWER: Pressure of the exploded gases in the cylinder of any engine is substantially equal in all directions. This means that the force will be exerted equally against the head of the moving piston and against the cylinder.

In the conventional combustion engine only the piston moves. Consequently, this part converts the explosive force into motion. In your design you split this force against two moving vanes coupled together in the turbine wheel. Since these vanes are part of the same rotary unit, they must move in the same direction. But, because the explosive force acts against both in opposite directions, there can be practically no motion. We don't feel that your design would work if you built it.



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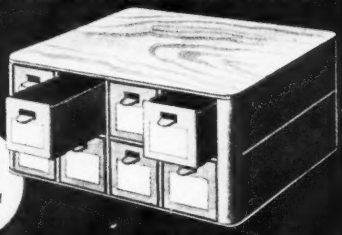

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The Editor's Workbench

[*Continued from page* 26]

war. I've stepped down into them and I've stepped on level floors to prevent stepping down and thereby breaking an ankle. I've been put to bed in them and I've also looked over, under and through the steering wheels.

But I have a living room and a bedroom in my own home—I don't need them in a car. I can look at mammoth engines on trucks—I don't need them for my purposes. If I feel like doing exercise I can spade my garden—not turn a steering wheel about ten times in order to turn my car around.

I want a car with economy of operation, a minimum of gee-gaws, a maximum of controls and gauges that tell me how the car is doing, a lightweight, short wheelbase and good styling. And I don't mean tons of chrome and fenders four yards wide.

I'm so disgusted with the new cars I'm actually going to become a mechanic and designer myself. And so help me, I'm going to pick up a second-hand model, strip it down, leave off all the junk and weld the body back together exactly the way I want it!

Jack H. Perrine
Cypress, Cal.

Dear Editor:

. . . I will tell you what I think of the cars of today in just two words—they stink!

J. N. Radabaugh
Dayton, Ohio

Dear Editor:

. . . In two months I will be graduated from college and will soon be considering the purchase of a car. But look what a choice I have—18 bulging contraptions looking like pregnant hippopotamuses.

John W. Knight
Memphis, Tenn.

Dear Editor:

. . . I have said all along that the manufacturers of today's cars must use street cars for their own means of transportation.

William Clark
Youngsville, Pa.

Dear Editor:

. . . Let's face this problem of modern car construction like real men and blame it on the women. The average man is highly influenced by his spouse to buy a glorified showroom exhibit instead of a practical auto. The people who gripe the most about impractical cars are usually just the ones who buy them.

The automotive market is too highly competitive to be dealt with in a public opinion

poll. Just influence the sales charts by not buying.

W. S. Coffin
Glen Ridge, N. J.

Dear Editor:

. . . Last year I was in the market for a new car but was so dissatisfied with what I could get for the money in the new models that I spent $1200 to rebuild my 1937 Chevvy coupe. I have over 300,000 miles on it now and I'm still very satisfied.

Verle M. Gant
Reedley, Cal.

Dear Editor:

. . . I object to paying my hard-earned dollars for all the useless plumbing, fender pants and one-piece body fenders now standard on practically all cars. I hate to pay for it in the beginning and I shall hate even more to pay for it again if I happen to get a minor side-swipe or traffic bump.

E. J. Rhodes
Colorado Springs, Col.

Dear Editor:

. . . I believe the best car ever made in its price class was the Model A Ford. If some enterprising manufacturer were to place on the market a car about the same size, weight and general appearance of that car, put a six-cylinder power plant in it and smaller wheels and hydraulic brakes on it, then sell it for less than a thousand bucks, he'd really have a fast-selling car.

E. Maier
Port Arthur, Ont.

Dear Editor:

. . . Bumpus states: "Maybe they (auto manufacturers) base their policies on some sort of Gallup poll." General Motors claim that they do. Recently I saw their much-publicized show in New York at which they handed out a little booklet entitled "Your car as you would build it." Inside the cover—where you were supposed to take your pick of several car designs—they gave you no real choice at all. The ideas were all the same and you felt you were being steered through on a quick tour.

John Velte
Princeton University

Dear Editor:

. . . In reply to Mr. Bumpus' letter on the present wobble buggies, I can only say—why beat your brains out trying to get the American manufacturers to build a decent car. If you'll only forget your prejudice against Eng-

[*Continued on page* 34]

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The Editor's Workbench

[*Continued from page* 33]

lish cars you can buy a fine family car known as the Austin A40. It has everything a good, reliable car needs. If it's a sport roadster you need, I can't think of a better car than an M. G. I own both of these cars and I think they are really perfect for my money. So why wait for something that won't be built here for a long time to come?

Russell Peel
Richmond, Ind.

Dear Editor:

First, may I say that nothing is perfect and this includes our present-day cars.

Manufacturers no longer make only one car which is supposed to satisfy everyone. If the comforts of a new Cadillac suit neither you nor your pocketbook you have the choice of a number of cheaper cars built with an entirely different purpose in mind.

The "specialists in differential calculus" do have you and me in mind when they build their cars. Compare the space, interior and exterior design, lighting, luggage room, riding qualities, ease of operation and general economy of your average car with a '32 Auburn. Fenders are no longer something stuck on a car to keep the mud out of your eyes, but are actually a part of the car itself. In regard to the inability on the part of the new cars to pull trailers—some trucks would have trouble pulling the 35-foot giants manufacturers are producing today.

I feel there is no need of manufacturing a new car to suit the public—the public already has everything it needs.

Don Bremer
Battle Creek, Mich.

Dear Editor:

. . . Let's not forget that Ford has sent out questionnaires to the public, dealers and other people in the auto business to see what they wanted. They asked for a reduction in the height of cars and the elimination of the drive shaft bumps. Thus the Hotchkiss drive which many Ford owners are now finding fault with. The public asked for it and they sure don't appreciate it. We'll have to let the manufacturers decide what is best.

Curtis E. Vetter
Vermillion, S. D.

The letter from G. M. Bumpus (we're slightly suspicious of that name) which we printed in our April Workbench seems to have hit the nail almost squarely on the head as far as MI readers are concerned. Quite a few felt

[*Continued on page* 39]

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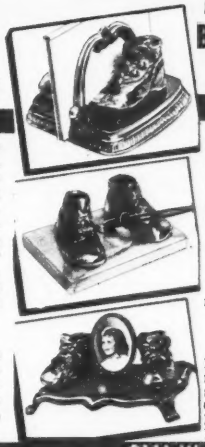

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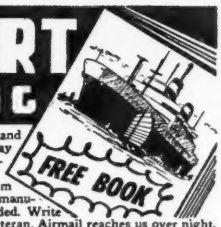

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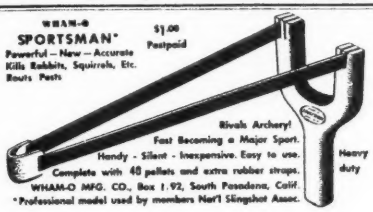

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The Editor's Workbench

[Continued from page 34]

strongly enough about the sad state of American cars to write us about it. In case you're interested, the mail ran about 20 to 1 in agreement with Bumpus' condemnation of Detroit's latest products.

From a Male Driver

Dear Editor:

Mrs. Winton (World's Fastest Woman Driver, March MECHANIX ILLUSTRATED) might be the greatest woman driver in the world, but how did she get that dent in the left front fender?

182 Lee St.
Seattle 9, Wash.

Well, it was like this. There she was parked at the curb, mind you. . . .

How To Recognize Pebbles From Heaven

Meteorite hunters can check their findings —free of charge—with the Smithsonian Institute to discover if what they picked up is really a pebble from heaven.

Fully 20 to 25 meteorites are sent there each month for identification, but few prove to be genuine. Slag or cinders are most commonly mistaken for meteorites.

The Smithsonian has been collecting and studying meteorites for nearly 100 years. Today it has one of the largest collections in the world. If your find is better than specimens already on hand, they will undoubtedly offer you a good price for it.

Nearly 800 of these bits of rock from outer space have been collected by the Institute. Some were actually seen as "shooting stars" flashing across the heavens before they struck the earth. Portions of two stony meteorites observed falling over Italy nearly a century ago, have just been received.

The Smithsonian collection is remarkably complete. Specimens in the group represent 70 per cent of all the known falls in the United States and around 55 per cent of all the known falls in the world.

If you believe you have found a meteorite, compare its weight with that of other stones in the field. All meteorites are heavy—much heavier than the average rock. Examine it closely; meteorites never have cavities or pores like those found in slag or cinders. In general they're rounded or irregular. Then, if you still think you've found a meteorite—check with the Smithsonian Institute, in Washington, D. C.

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Here's What Only 15 Minutes a Day Can Do For You

I DON'T care how old or young you are, or how ashamed of your present physical condition you may be. If you can simply raise your arm and flex it I can add SOLID MUSCLE to your biceps—yes, on each arm—in double-quick time! Only 15 minutes a day—right in your own home—is all the time I ask of you! And there's no cost if I fail.

I can broaden your shoulders, strengthen your back, develop your whole muscular system INSIDE and OUTSIDE! I can add inches to your chest, give you a vise-like grip, make those legs of yours lithe and powerful. I can shoot new strength into your old backbone, exercise those inner organs, help you cram your body so full of pep, vigor and red-blooded vitality that you won't feel there's even "standing room" left for weakness and that lazy feeling! Before I get through with you I'll have your whole frame "measured" to a nice, new, beautiful suit of muscle!

What's My Secret?

"Dynamic Tension!" That's the ticket! The identical natural method that I myself developed to change my body from the scrawny, skinny-chested weakling I was at 17 to my present super-man physique! Thousands of other fellows are becoming marvelous physical specimens—my way. I give you **no gadgets or contraptions to fool with.** When you have learned to develop your Strength through *"Dynamic Tension"* you can laugh at **artificial** muscle-makers. You simply utilize the DORMANT muscle-power in your own God-given body—watch it increase and multiply double-quick into real, solid **LIVE MUSCLE.**

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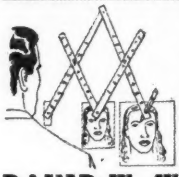

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Raindrops 'Fall' Upward As Science Checks Shape

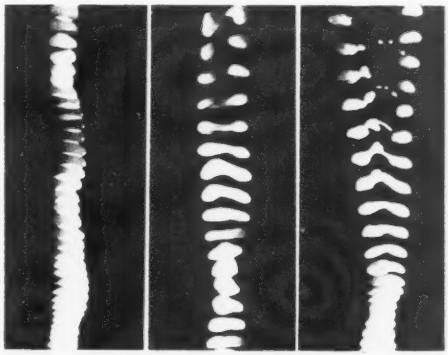
Raindrops are not tear-shaped, and for that matter neither would tears be if they fell very far. That's what General Electric weather scientists found as a result of lab tests in which raindrops were suspended in mid-air and even "fell" upward.

Instead of being symmetrically streamlined like a tear, large raindrops can change into a "new look" as often as 50 times per second. They can resemble pancakes, hot dogs, caterpillars and even human feet.

In a special study simulating raindrop behavior, the G-E scientists developed an instrument known as a "drop controller," in which air resistance was produced similar to the resistance falling raindrops encounter.

Reversing the natural procedure, however, the instrument caused a rush of air to move upward against a drop of water, instead of the drop falling against the air.

By regulating the upward air current, a drop of water could be suspended for short periods of time or even "fall" upward.



The three pictures above are stroboscopic shots of the "falling" drops. At left, a large drop resembles a string of taffy (bottom), shows oscillation from one shape to another and then back to original shape. In upper part of picture, the drop looks like a series of hot dogs in a roll.

At center, another large drop starts upward as a string of jelly beans, changes into a gourd, then becomes human feet both flat and arched and finally turns into a dumb bell (top).

At right, a large drop, after graduating from jelly beans to gourd to pancake, takes shape of a phone receiver. Development of neck in middle becomes increasingly pronounced until it fractures, making separate drops of the two bulging ends. •

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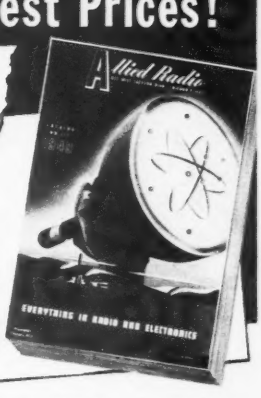

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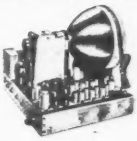

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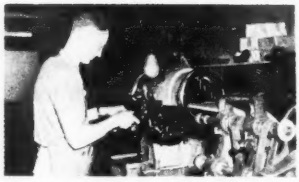

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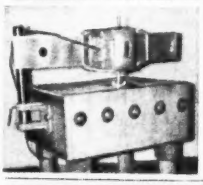

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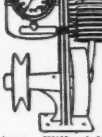

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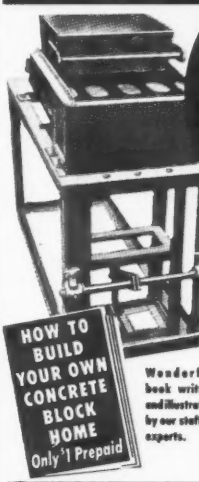

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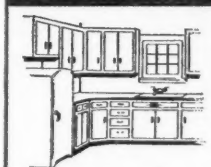

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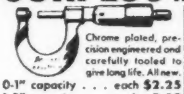

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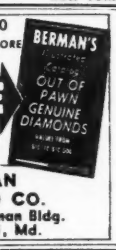

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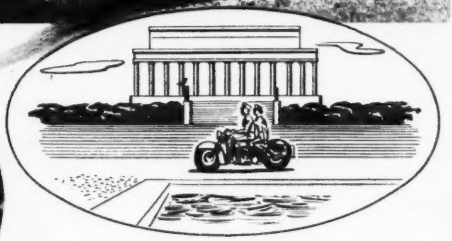

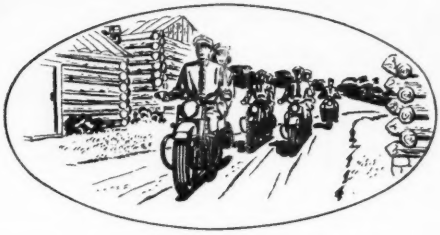

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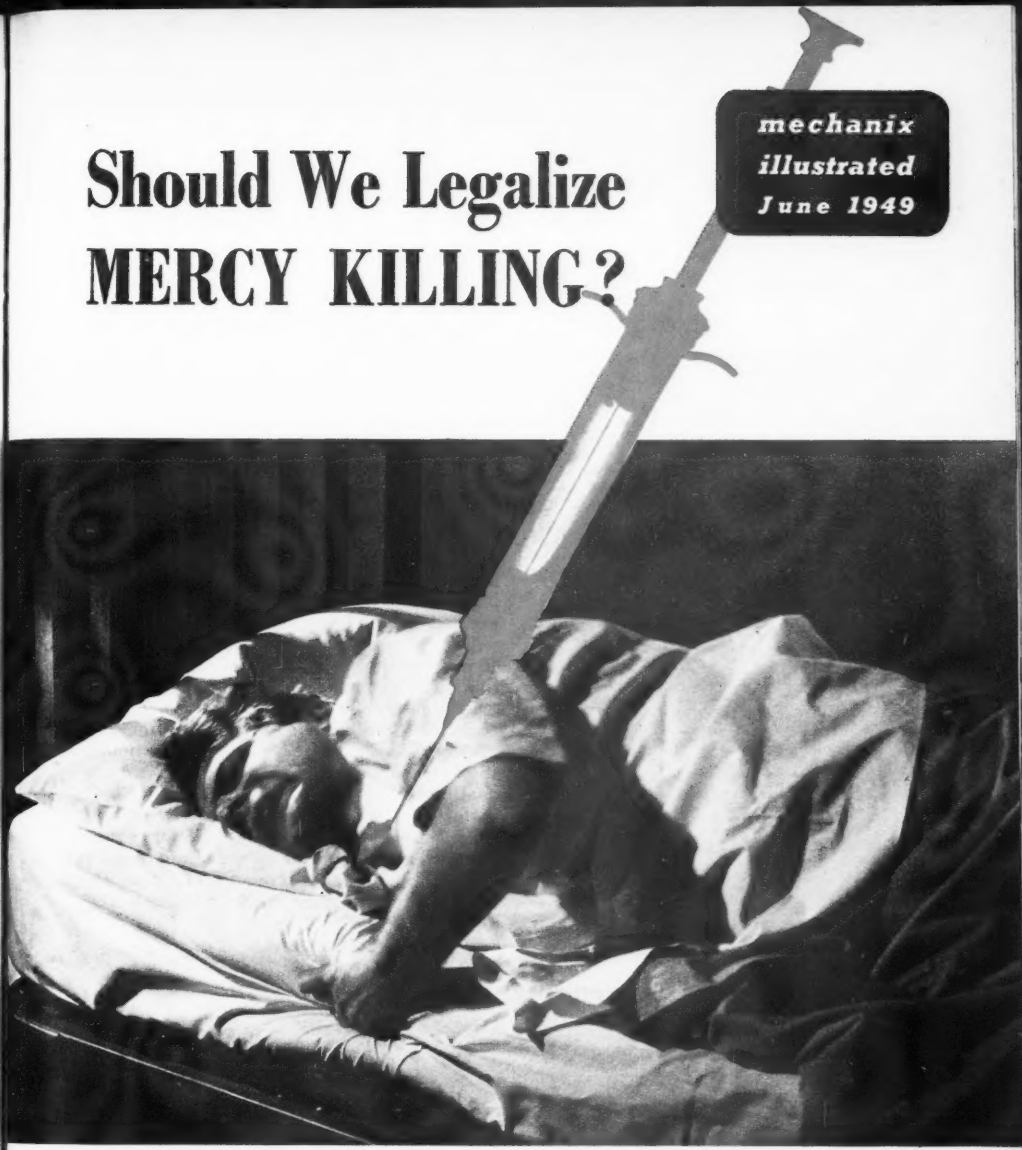
June 1949

Should We Legalize MERCY KILLING?



Many people are urging enactment of a law permitting tortured incurables to be put to death. Here are facts for and against euthanasia.

By Lester David

BOOTLEG mercy killings are on the rise all over the nation!

Tortured invalids, racked by the agony of incurable disease, facing months of searing pain before the inevitable end, are imploring relatives, friends and doctors to help them die. And more and more the persons to whom they appeal heed their pitiful pleas, fill a hypodermic with a narcotic overdose or

The Rev. Dr. Charles Francis Potter is founder and first president of the Euthanasia Society of America which sponsors the bill.

In the picture, Act of Murder, Fredric March gets idea for mercy killing from drug store sign. Euthanasia Society cited him for his part in the movie production.

saturate a towel with chloroform and bend over the writhing patient in the secrecy of the sickroom.

Authority for this startling statement is the Rev. Dr. Charles Francis Potter, founder and first president of the Euthanasia Society of America, which for the past decade has been fighting to legalize mercy deaths.

Listen to what Dr. Potter says:

"Of the 172,000 persons who died of cancer in the United States in one year alone, do you suppose all were permitted to drain the last bitter drop of the cup of pain? Many had faithful friends who helped them to die in dignity and repose instead of shrieking, groaning and cursing till their breath failed."

How many thousands have given swift release in this way, facing death themselves by the noose or the electric chair, no one can estimate. But because of this alarming rise, because of the ever-increasing life span which makes people more than ever prone to the degenerative diseases which cause excruciating pain before death comes, a climax may be reached soon in this bitter controversy.

In the high-ceilinged chambers of the New York State Legislature the lawmakers may be asked to write into the statute books the nation's first act legalizing mercy deaths.

Battle lines are being drawn now for the clash. Arrayed on one side is a proposed law, already prepared in every detail, and backed by a committee of 1776 doctors, some among the most eminent in the state.

Reverend Siple (left) watches his wife weep after he was given life sentence for poisoning 18-year-old daughter, Dorothy Ann (above), because he thought that she was "mentally incompetent."

And standing behind as shock troops for spiritual support are 379 Protestant and Jewish clergymen, who have affixed their names to a petition calling upon the Legislators to enact the measure into law. On the other side, marshalling last-ditch opposition, are Catholic and other clergymen, physicians, lawyers and veterans' groups who cannot condone the taking of life under any circumstances, who are deeply convinced that euthanasia "is an attempt by man to assume a power that belongs only to God."

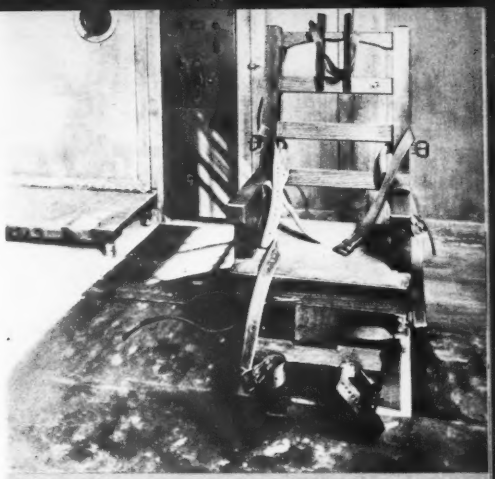
Whichever way the lawmakers vote, court records show that there has been a marked softening in the past several years in the attitudes of juries toward prisoners who stand in the dock on mercy killing charges.

Twenty years ago a young father was jolted to death at the end of a noose in a midwestern state for putting his helpless imbecile son to death with an overdose of sleeping pills.

And recently, 20 years later, a wealthy New York City manufacturer walked out of a Bronx court a free man after he had confessed to a jury that he had committed a similar act for the same reason.

That was the case of the State vs. Louis Greenfield and here is what the sobbing father said on the witness stand:

"We loved our son, Jerry, loved him all the more because at the age of 17 he had the brain power of a child of 2. He could only babble incoherently and often had fits of agony which almost drove us insane with our [*Continued on page* 145]



"Do we really regard human life as sacred?" ask euthanasians. Then they point to electric chair (above) and brutal wars.

MASS MURDER: Germans slaughtered millions, using their own false doctrine of "mercy" killing to excuse their crimes.

Booked on suspicion of strangling her 5-year-old daughter, Mrs. Jeanette Paz cries hysterically in the Hollywood police station. The child was a helpless paralytic.

FIRE—*Origin Unknown*

A lens, a fishbowl, an icicle or even your own fingertips may hide the secret of a fantastic mystery blaze, flame sleuths discover.

By Richard Dempewolff

A Maryland doctor got the surprise of his life a few winters ago. Jolted from a sound sleep by an emergency call on his phone, he hopped from bed, threw on a fur coat and a pair of rubber galoshes for protection against the cold night. Then grabbing up his kit, he jogged out to the garage through the snow.

The doc's gas gauge hadn't been working for some time. So, as was his custom, he unscrewed the tank cap, rocked the car and put his ear to the opening to listen for the slosh and thus check the supply of gas.

A blinding explosion drowned out the sound of the slosh. The blast demolished the car, blew the garage sky high and the doctor into a snowbank in his neighbor's yard, 50 feet away. After the doctor painfully crawled out of the snow, he himself

The doctor shook his car to check the gas—and a blast checked him into the hospital.

was an emergency case for the hospital.

Fire department investigators worked on that case for some time to learn the cause of the explosion. The doctor had lit no match. The car motor was not running. There was no source of heat in that icy garage. What blew up those gas fumes?

The case might have been added to the long list of fires bunched under the heading Origin Unknown, if it hadn't been for a smart fire detective. He donned a fur coat and galoshes, then acted out the doctor's midnight dash through the snow. When he'd bustled over the snow and reached for the cap on the gas tank, he noticed something—a spark of static electricity jumped from his fingertip to the metal!

By hustling along as he had, the good doctor had generated a load of electricity in his fur coat. When he put his ear to the gas tank in which the agitated fluid was sending off bountiful fumes, he grounded a spark against the metal of the car. That was all. But for the imagination of a crack investigator, no one would ever have known.

The National Board of Fire Underwriters has gone to great pains to prove that 75 per cent of our $600,000,000 annual fire bill is caused by such things as smoking gear, faulty electrical equipment, stoves and furnaces and inflammable liquids. Most people will at least admit that these things bear watching. But what about that other 25 per cent? These are the blazes with "mysterious" or "curious" beginnings—spontaneous ignition, static electricity, lenses, fishbowls. There's even a case where an icicle started a fire. Most fires of unknown origin could probably be traced to these strange causes—if they could be traced. For obvious reasons, they're hard to trace, and hard to prevent, too, because people won't believe such queer things can set off a fire so easily.

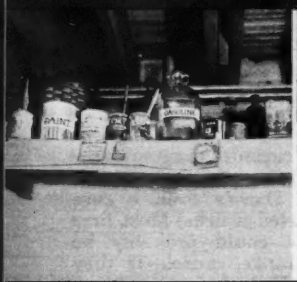
The average American male, given a box of matches to start a picnic fire, will use every lucifer in the packet and still wind up with a smoldering, smelly pile of sticks and a foul disposition. He will swear it takes an atom bomb to start a blaze. He may grudgingly admit to the possibility of spontaneous combustion and concede reluctantly that lighter fluid is inflammable outside of a lighter.

But tell your closest friends that a gasoline truck driver was a virtual storage battery for static electricity and blew up three trucks in three days with his sparks, or that an old dust mop ignited by spontaneous combustion and burned up a lavish estate—and watch the unbelieving sneers. Yet these things have happened.

Perhaps the weirdest fires on record are those started by human generators who don't even know their own voltage. Everyone stores up static electricity to a certain degree. Who hasn't snapped sparks from his fingertips after shuffling across a deep pile rug? But the fellow with the torch in his fingertips is the one who stores up the

HOW MYSTERY FIRES START

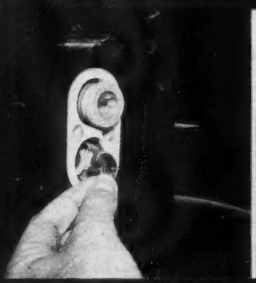
Photos above and in row below courtesy National Fire Protection Association



1. Gas in glass or old paint in cans may set off a mystery fire bomb in your basement.

2. Leave the plug in the iron. You can forget the wrinkles—they'll all go up in smoke.

3. Run a wire under a rug where it can fray—and you'd better run from a strange fire.



4. A penny in the socket may save buying a fuse but cost you your home—and life.

5. That burnt mattress may hold the secret to the fire fatal to 121 at the Hotel Winecoff.

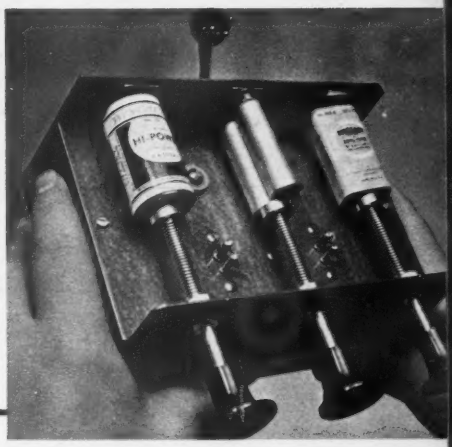
6. Biggest cause of "unknown" blazes is cellar junk, safe as a blow-torch in a powder keg.

charges he collects. His sparks can sometimes gap an arc of several inches.

No one knows better just how easy it is to self-start a fire than a certain farmer in Yakima, Wash. On a windy day two years ago this man went out to spray his apple trees with an inflammable insecticide. The wind blew the spray back and forth as he worked, soaking not only the trees but the farmer as well. Finished spraying, he started home, generating a large amount of electricity in his wet pants through friction caused by his brisk walk. A hundred yards later, he had built [*Continued on page* 152]

NEW in SCIENCE

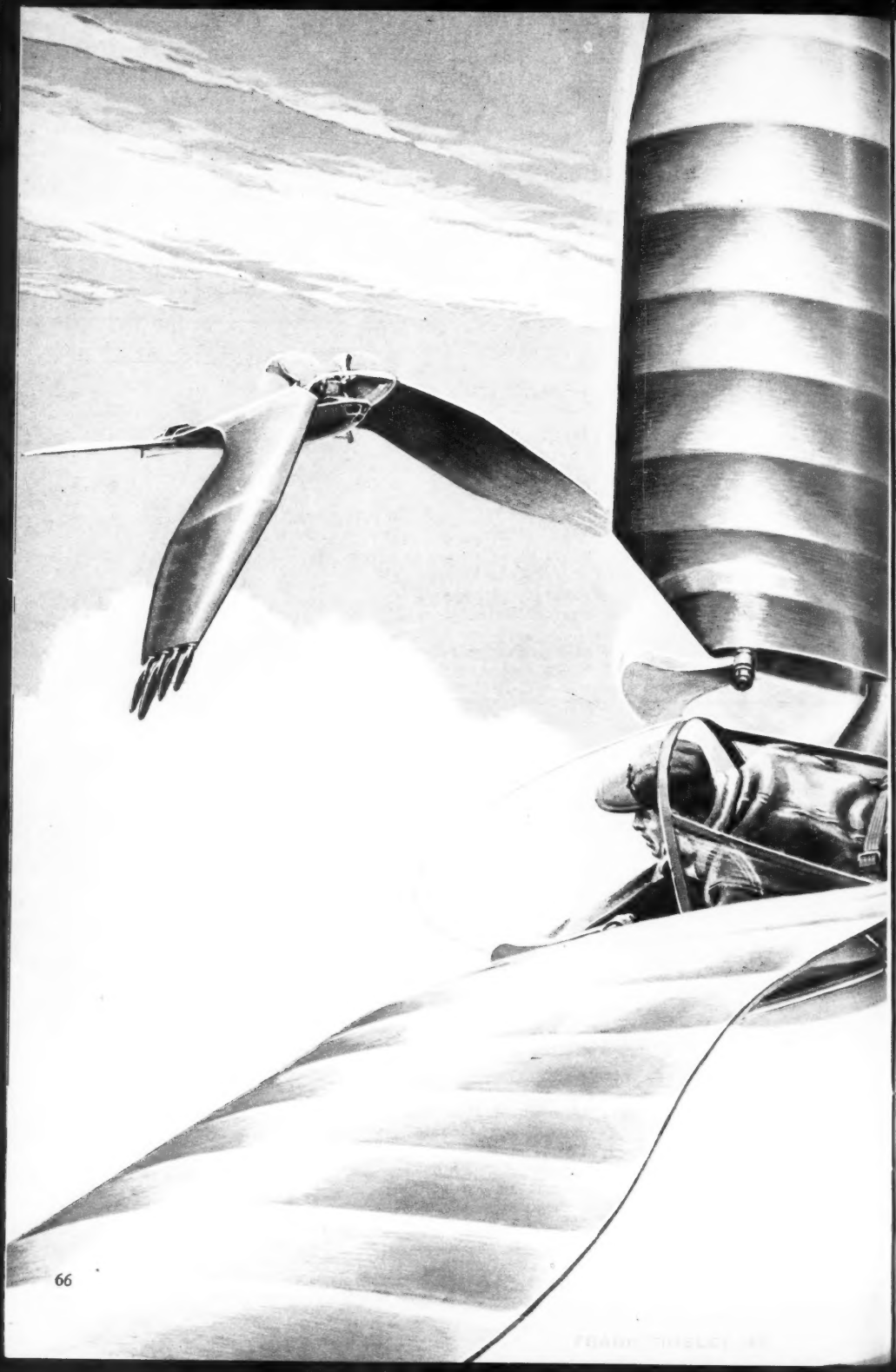
Signal Ear is a siren-controlled traffic regulator which picks up the sound of sirens before the fire engine or ambulance actually reaches the intersection and turns the signal lights red. Pacific Signal Co., Lynwood, Cal.



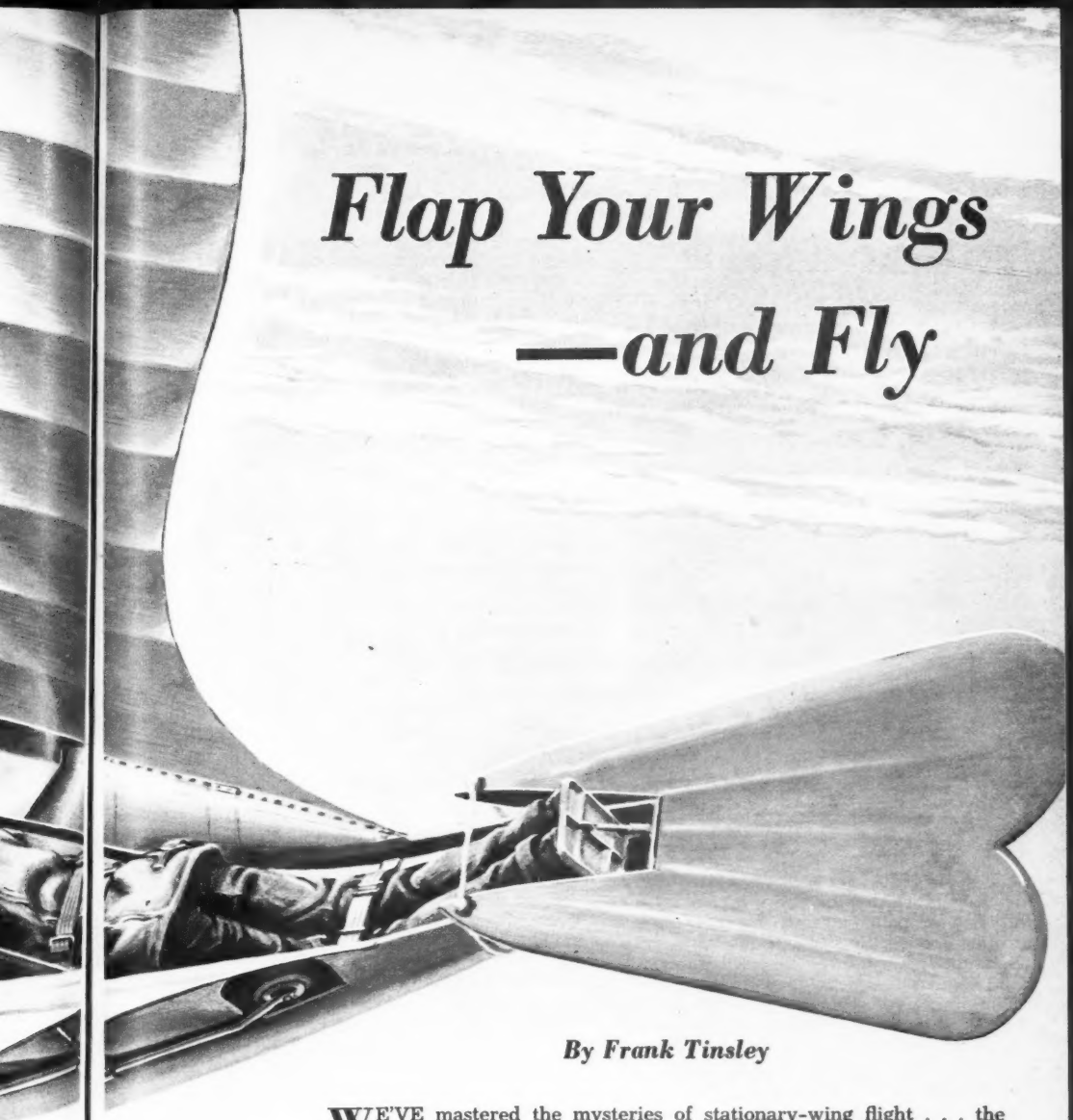
Battery Recharger cuts operating costs for wearers of hearing aids from about $5 a month to less than $.50. It's a gadget which plugs into any 110-volt AC outlet and recharges batteries. Mecon Products, Los Angeles.

Baby Eggbeater is not a craft for midget pilots but a model helicopter used by the Air Force in aircraft research. Some planes take three months to build and cost $25,000—but save lives and money in the end.

Safety Safe: even a Houdini couldn't open this one without knowing the combination. The Army's experimenting with this new model which has a key lock in the center to keep it from clicking and giving away the secret.



Flap Your Wings —and Fly



By Frank Tinsley

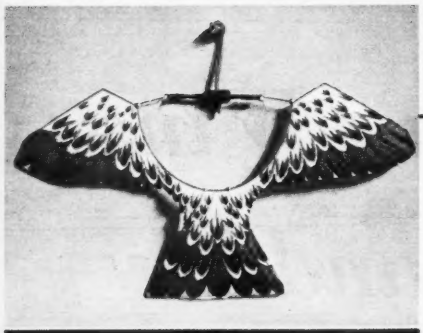
WE'VE mastered the mysteries of stationary-wing flight . . . the Wright brothers did that. Cierva showed us how to fly with a rotating wing . . . he gave us the helicopter. Now we are on the verge of solving the most intriguing problem of all: flapping-wing flight.

Experiments by Adam J. Stolzenberger, a young engineer at the Air Forces research center at Wright Field, Dayton, O., are pointing the way.

Stolzenberger, a wartime pilot of gliders and bombers, is working on plane vibration for the Aircraft Laboratories at the field to find out what causes the uncontrollable flutter that often rips apart wing tips and tail surfaces at high speeds. While studying these destructive vibrations, he had a flash of inspiration:

Instead of trying to eliminate those dangerous wing-wagging forces, why not put them to work to power a pair of flapping wings?

Quietly he began his own personal experiments last year to test his



Secret of flap-wing flight lies in the mechanical bird's odd head, an unbalanced rotor that spins on the band. Below, Stolzenberger lets his bird fly.

idea for an ornithopter, the technical term for a flap-propelled aircraft. He built small birdlike models that had their wings set on hinges. For power he used rubber-band engines that developed strong vibrational forces by whirling an unbalanced stick or rotor. These vibrations set up a wide flutter or resonance in the wing spars and made the wings flap up and down as if Stolzenberger's mechanical birds had suddenly come to life.

During his experiments he built more than 250 flying models and tried out numerous shapes and wing forms, including those of swallows, hummingbirds and eagles. These mechanical birds take off from his hand or some fixed point. They flap upward a moment to clear obstacles, then level off and fly straight as a crow. Through resonance with the rotor that creates flutter-waves by its off-balance spinning, the wings flap like a real bird in flight.

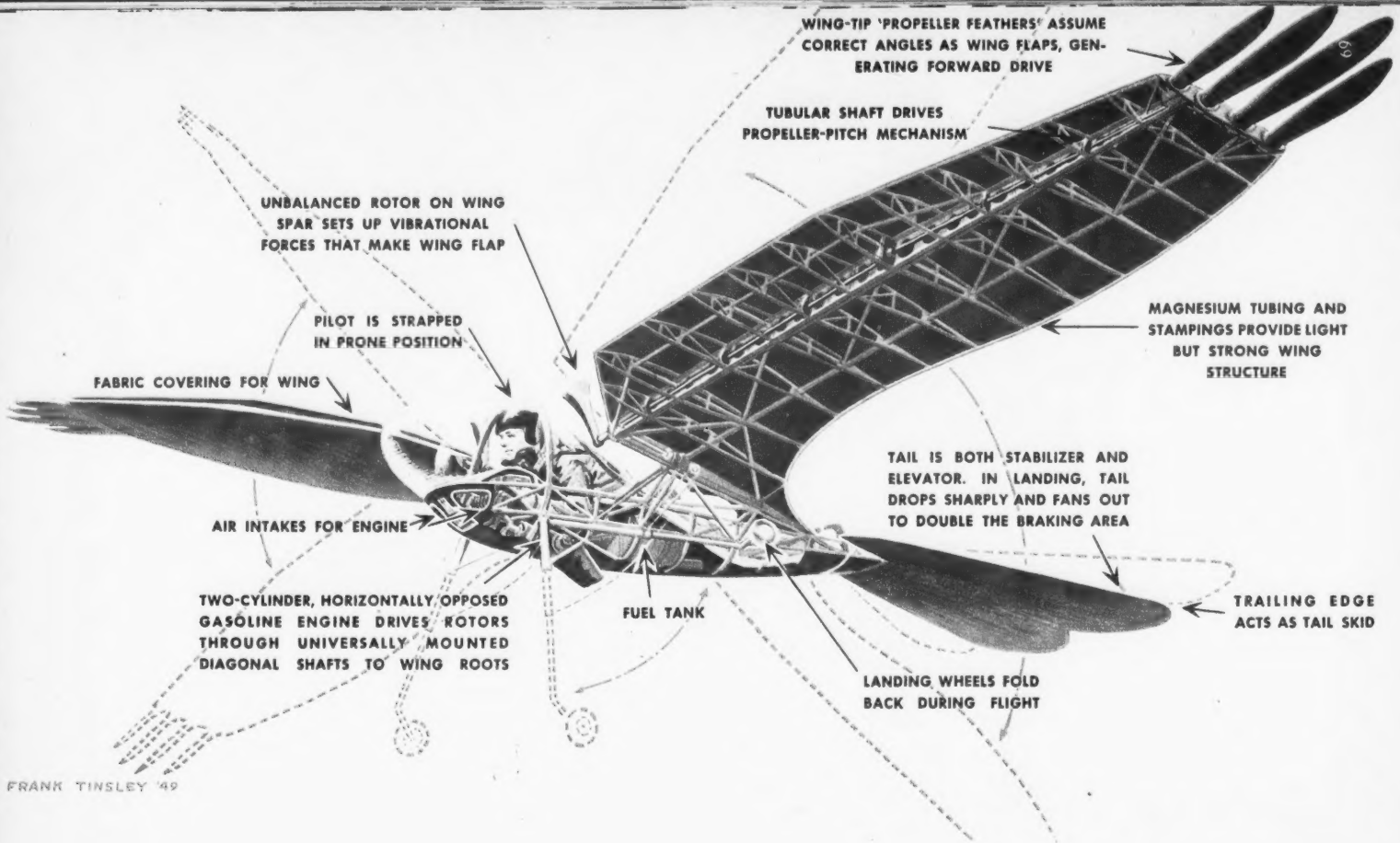
One day recently when Stolzenberger was test-flying a mechanical bat, the model slipped away from him and darted out of an open door. Suddenly screams of terror shook the building. Stolzenberger dashed down the hall and found hysterical secretaries scrambling out of a near-by office where his lifelike bat was flitting overhead.

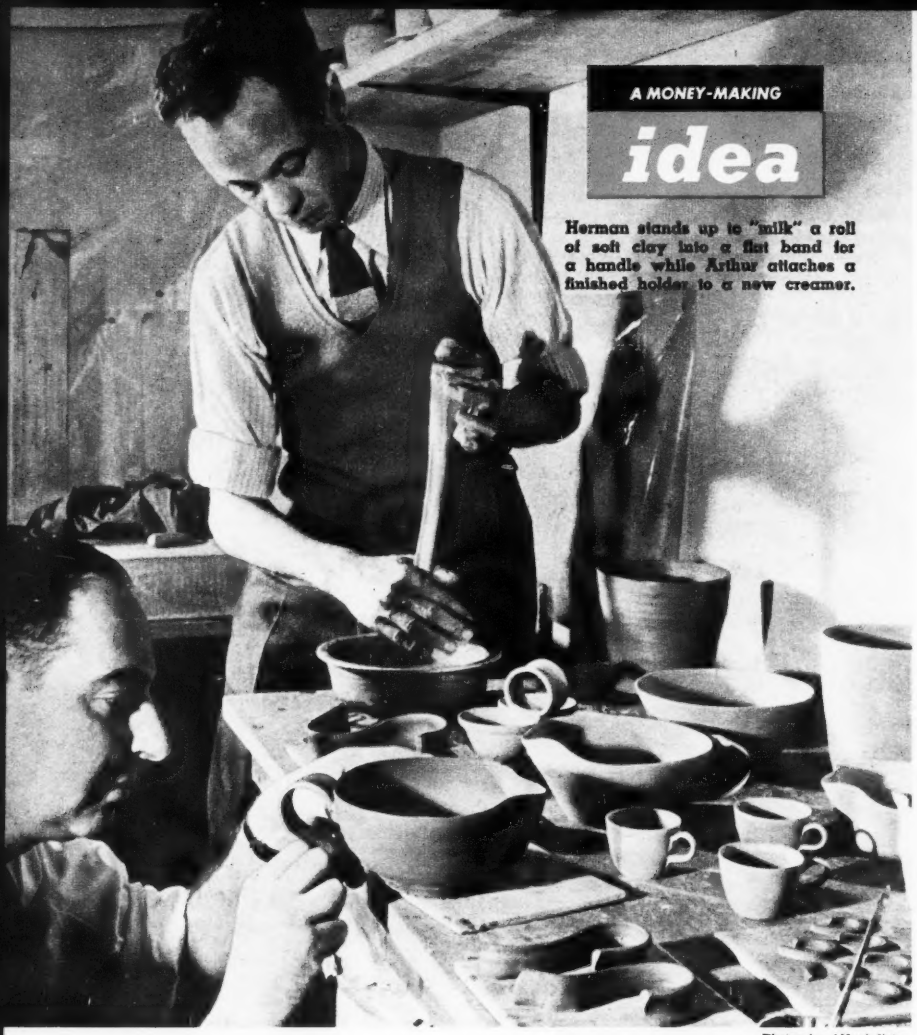
Following up his vibrating-wing idea, Stolzenberger has just patented a large man-carrying machine that promises to be the world's first successful ornithopter. On these pages MI presents its own design of a practical flap-wing flyer, based on principles similar to those revealed in Stolzenberger's remarkable experiments.

A light-weight, twin-cylinder gasoline engine, fitted with a clutch and reduction gears, powers MI's ornithopter. Through flexibly connected shafts to each wing, the motor drives a pair of wing-mounted rotors. The unbalanced spinning of these rotors provides the vibrational force for flapping the wings. Facing to the rear and set at a slight downward angle, the engine is mounted in the deep, birdlike "breast" of the ornithopter's body. Air inlets, ducts and a controllable discharge vent, cool the powerplant.

Fuel, carried in the belly of the machine, is pumped up through a small header tank beneath the pilot's chin-rest, then down to the engine. A yank on pull rope, such as you use for an outboard motor, starts the engine. Instruments and controls are immediately above the powerplant and directly connected to it. The drive shafts, springing diagonally from either side of the gear box, are mounted universally and through their upper ends tie in with the rotor shafts. An automatic safety locks the wings at the correct soaring angle whenever you unclutch the engine.

Except for the breast section, the bird-shaped fuselage is comparatively shallow. It's barely large enough to hold the pilot comfortably. Built of a glass plastic, over a light magnesium frame, the fuselage is molded to fit the body. For greater comfort, the interior is lined with airfoam rubber. The upward angle of this narrow, horizontal cockpit, padded arm troughs, control positions and chin-rest follow the lines of the new Air Force "prone-pilot bed." Safety straps, stirrup foot rests and high, gull-type wing roots on either side hold the pilot [*Continued on page* 156]


WING-TIP 'PROPELLER FEATHERS' ASSUME CORRECT ANGLES AS WING FLAPS, GENERATING FORWARD DRIVE
TUBULAR SHAFT DRIVES PROPELLER-PITCH MECHANISM
UNBALANCED ROTOR ON WING SPAR SETS UP VIBRATIONAL FORCES THAT MAKE WING FLAP
PILOT IS STRAPPED IN PRONE POSITION
FABRIC COVERING FOR WING
MAGNESIUM TUBING AND STAMPINGS PROVIDE LIGHT BUT STRONG WING STRUCTURE
TAIL IS BOTH STABILIZER AND ELEVATOR. IN LANDING, TAIL DROPS SHARPLY AND FANS OUT TO DOUBLE THE BRAKING AREA
AIR INTAKES FOR ENGINE
TWO-CYLINDER, HORIZONTALLY OPPOSED GASOLINE ENGINE DRIVES ROTORS THROUGH UNIVERSALLY MOUNTED DIAGONAL SHAFTS TO WING ROOTS
FUEL TANK
TRAILING EDGE ACTS AS TAIL SKID
LANDING WHEELS FOLD BACK DURING FLIGHT
FRANK TINSLEY '49



Herman stands up to "milk" a roll of soft clay into a flat band for a handle while Arthur attaches a finished holder to a new creamer.

Photos by Alfred Eris

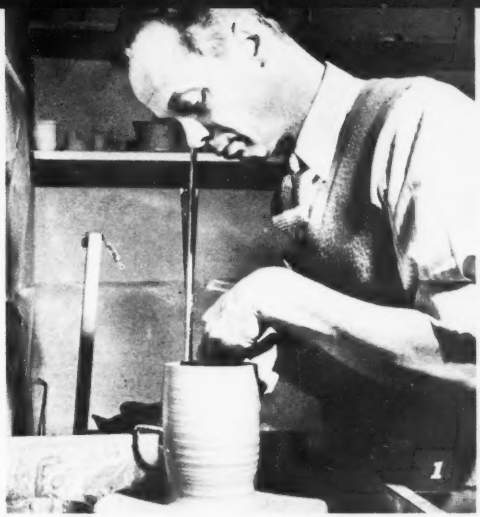
Our Business Went to Pottery

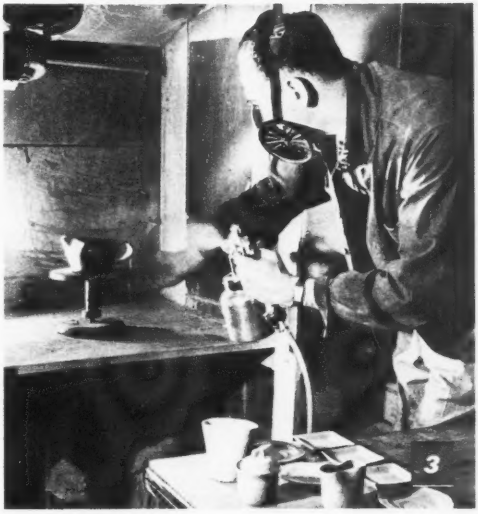
By Arthur Bernstein and Herman Curzon

WHY should a successful lawyer throw away his practice? And why should a personnel director upset his security by walking out on a solid government job?

We ought to know the reason for such strange behavior because we did just that. Arthur is that lawyer, and Herman the ex-executive. We had success and security in our former work but there was something lacking—in a word, *kick*. So we *kicked* over the traces of our jobs because we got bored with what we were doing and made up our minds to get a *kick* out of life.

To get out of the rut, we gambled in clay—and won! Now we own a busy shop on Manhattan's [*Continued on page* 158]





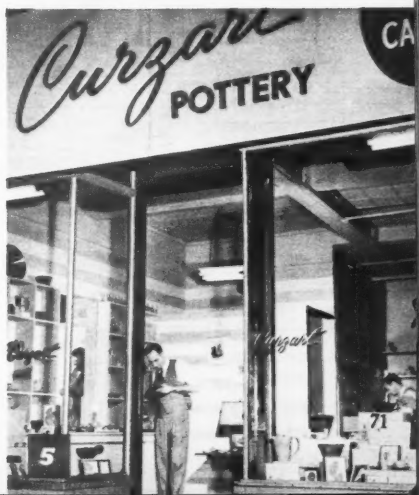
1 Turning clay into pottery, Herman shapes a flower vase on the wheel before firing.

2 Arthur unloads the kiln after giving the shaped clay its first firing at 1950° F.

3 Donning a gas mask, Arthur sprays a glaze on a creamer before final firing.

4 Herman displays the new pottery in the shop. Note odd shapes, unusual glazes.

5 Here's how the partners' smart pottery shop, the Curzart, looks to a stroller.



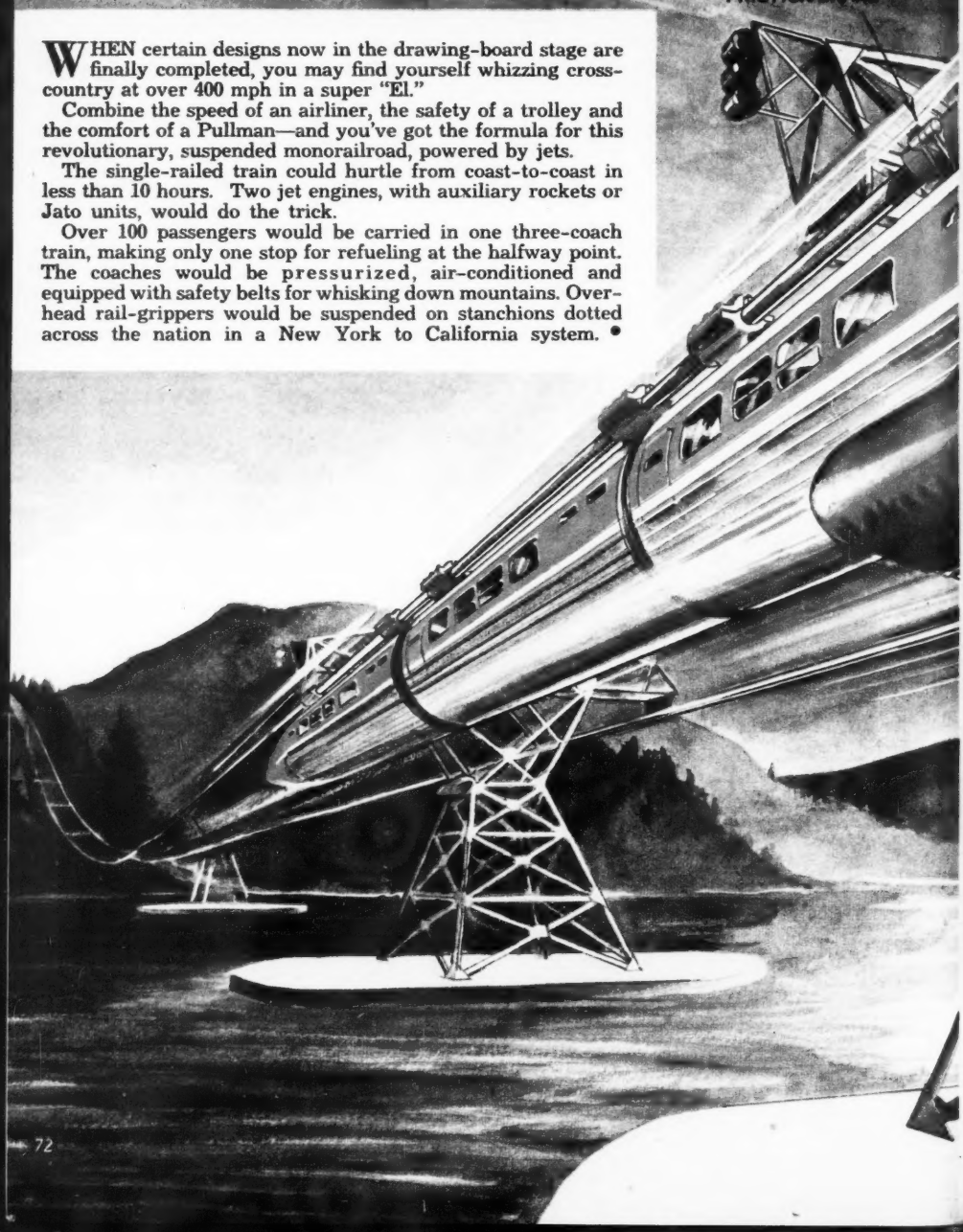
MONORAILROAD TRAIN ... jet-powered

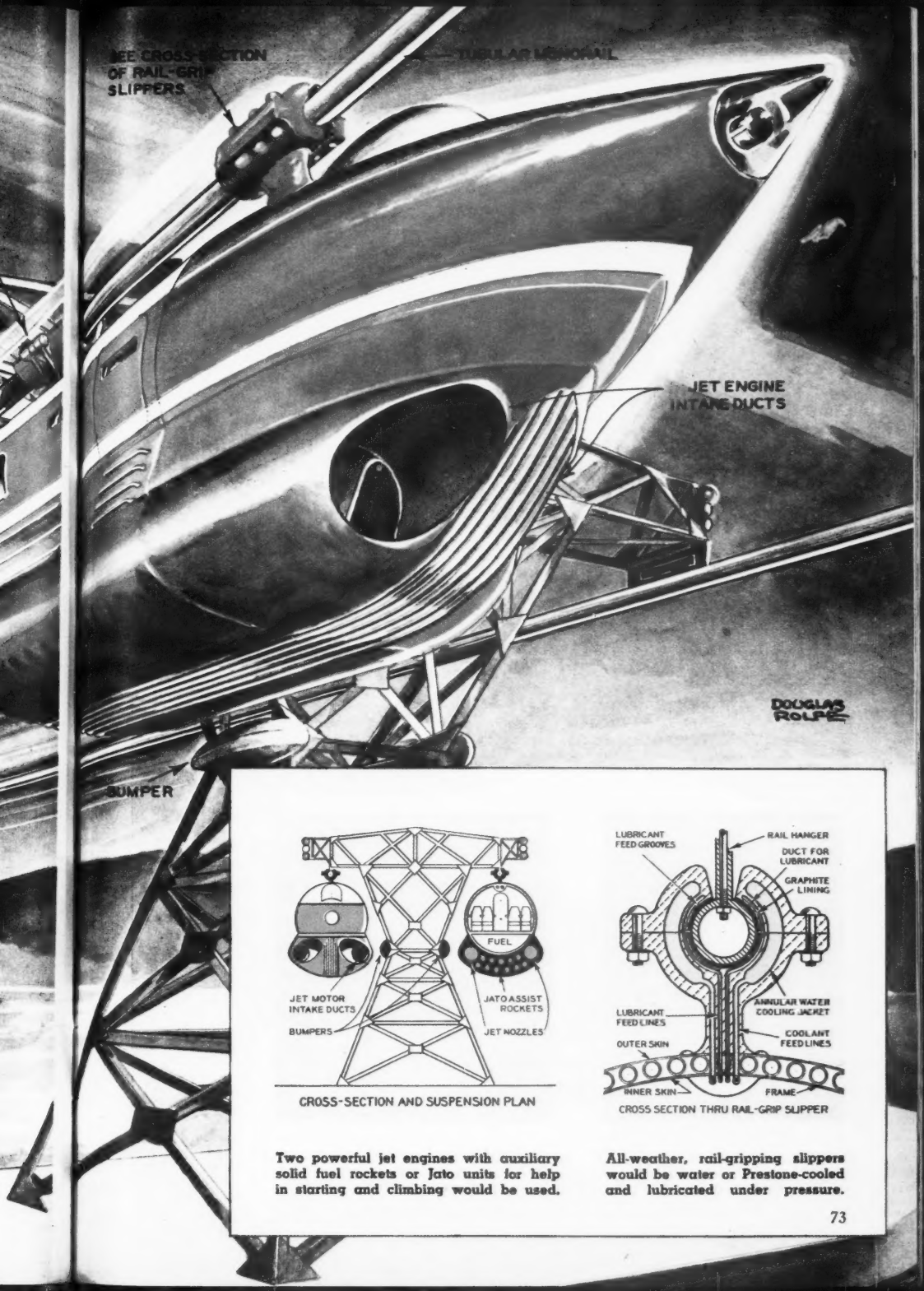
WHEN certain designs now in the drawing-board stage are finally completed, you may find yourself whizzing cross-country at over 400 mph in a super "El."

Combine the speed of an airliner, the safety of a trolley and the comfort of a Pullman—and you've got the formula for this revolutionary, suspended monorailroad, powered by jets.

The single-railed train could hurtle from coast-to-coast in less than 10 hours. Two jet engines, with auxiliary rockets or Jato units, would do the trick.

Over 100 passengers would be carried in one three-coach train, making only one stop for refueling at the halfway point. The coaches would be pressurized, air-conditioned and equipped with safety belts for whisking down mountains. Overhead rail-grippers would be suspended on stanchions dotted across the nation in a New York to California system. •





CROSS-SECTION AND SUSPENSION PLAN

CROSS SECTION THRU RAIL-GRIP SLIPPER

Two powerful jet engines with auxiliary solid fuel rockets or Jato units for help in starting and climbing would be used.

All-weather, rail-gripping slippers would be water or Prestone-cooled and lubricated under pressure.

Highway Hawkshaws

Even Sherlock Holmes has nothing on these roadside sleuths when it comes to tracking down hit-and-run killers.

DEATH ON THE HIGHWAY: at top of page, Sgt. Davy (left) and patrolman discover hit-and-run tragedy. Above, he reports it over radio-phone.

MI photos by Allan Gould

Then he carefully measures distance body was thrown, examines tire skid marks and looks for pieces of broken headlights or patches of paint.

At Massachusetts State Police headquarters, all of Davy's findings are recorded and then sent over radio and teletype in attempt to trap the killer.

An important clue, a shred of underwear cloth found on the fender of a suspected car, is removed and sent to the police laboratory for checking.

Lieut. Joseph T. Walker makes lab tests of evidence uncovered by Davy and other investigators. He compares cloth found with victim's underwear.

By Emile C. Schurmacher

THE middle-aged watchman never knew what happened when the speeding car hurled him 30 feet into a bank of weeds at the side of the lonely highway. He was dead when he hit the ground.

The terrified driver instinctively applied his brakes at the moment of impact. Then, seeing that there was no one about at that late hour, he bore down hard on his accelerator. In a matter of seconds, another hit-and-run car was swallowed by the night.

Just a few years ago, the chances of that tragedy being solved and the driver caught would have been approximately one in six. The car itself might have concealed its guilty identity permanently among the 37 million other vehicles on the highways.

But, in this case, just three hours later and more than 100 miles away, a police prowl car suddenly emerged from a side road and brought the escaping motorist to a stop. Two state troopers quickly examined the car by the beams of their flashlights. Then, one of them got into the car.

"Now, let's drive back to the place where you hit that pedestrian," he said.

The motorist protested. He didn't know what the trooper was talking about, he said. The trooper didn't argue. He opened his notebook and read from a radio report which had been broadcast from State Police headuarters just an hour before.

"Cruiser 63 reporting on hit-and-run death U. S. 6 describes fleeing car probably medium size," he read. "Small piece glass found from sealbeam headlight. Headlight probably cracked. Right rear tire oversize nubby tread. Look for snow tires. Right front worn and underinflated.

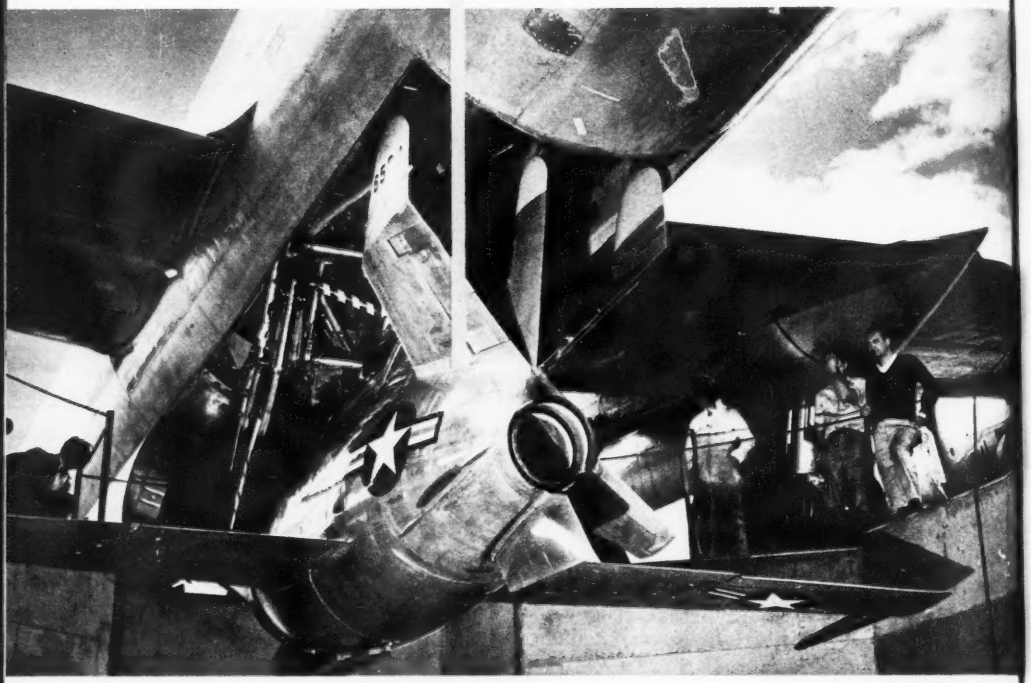
"Your car seems to answer this description," the trooper observed.

They returned to the scene of the tragedy. There, a [*Continued on page* 160]

NABBED: a trail of clues led to this hit-and-run murderer. Tell-tale hair and blood on the car itself proved the driver's guilt.

COVER STORY

Floating up from the loading pit on the mother B-29's landing trapeze, the bent-finned XF-85 looks more like a flying bomb than a fighter.

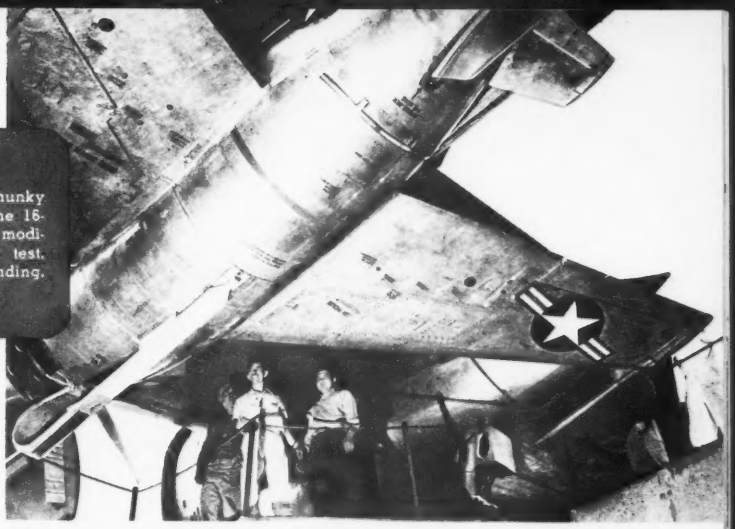


B-36 bomber, below, will pack three Goblins in its kangeroo pouch.

'The PLANE on the Flying Trapeze'

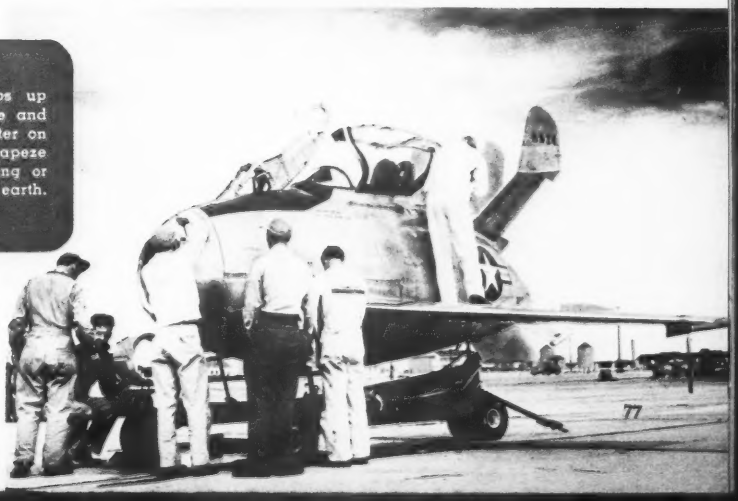
EIGHT miles above the California desert near Muroc a B-29 opened its bomb bay and gave birth to a Goblin, the Air Force's sensational parasite jet fighter. As the bomb-shaped XF-85 teetered at the end of an extended trapeze, the sweptback wings folded out flat in the 300-mph airstream. Suddenly the fighter unhooked and darted ahead into the blue. After buzzing around the sky in a test flight, Pilot Ed Schoch throttled down to return to base—back on the trapeze. On MI's cover you see the first record in color of the parasite jet landing aboard the kangeroo bomber.

Because the new round-the-world bombers far outranged any *land-based* fighters, the Air Force and the McDonnell Aircraft Corp. developed the XF-85 as a unique *air-based* jet to protect the giant B-36. Parasites soon will be using B-36s as flat-tops. So, enemy fighters take note: *The Goblins will get you if you don't watch out.* •



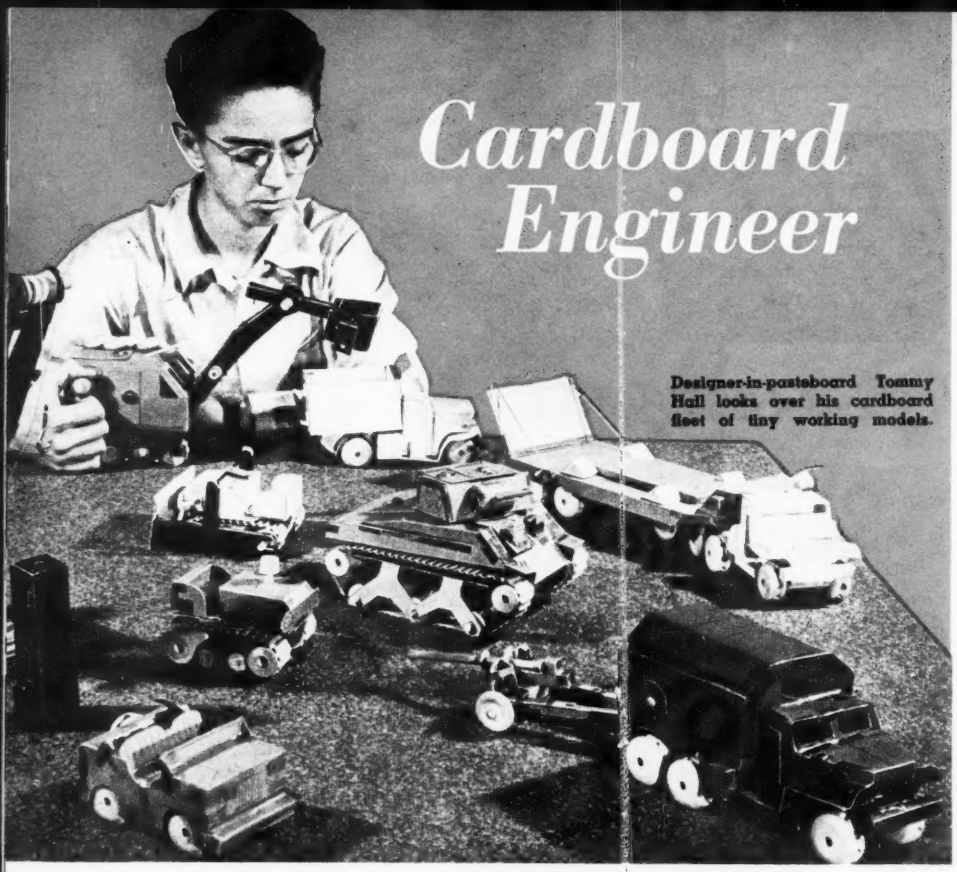
It's a tight fit as the chunky 15-foot jet eases into the 16-foot bomb bay on the modified B-29 for a flight test. Ski skid is for crash landing.

Head-on, the grounded Goblin shows its jet mouth which sucks in air for its Westinghouse J-34 turbine. Wheels aren't landing gear but a dolly for land-handling the jet.



The big skyhook pops up from the Goblin's nose and balances the tiny fighter on the bomber's flying trapeze for an acrobatic landing or launching miles above earth.

Cardboard Engineer

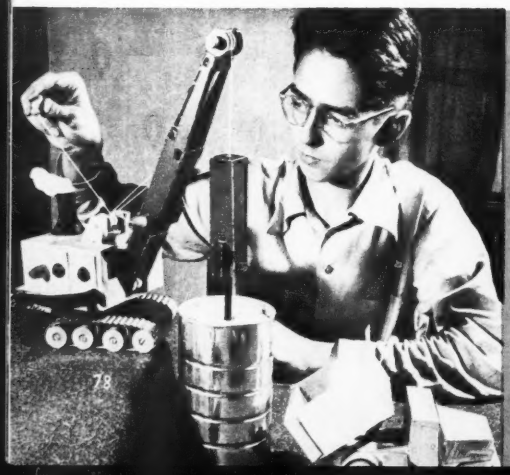


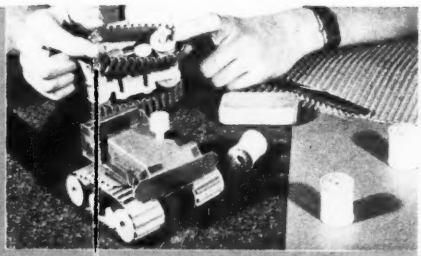
Designer-in-pasteboard Tommy Hall looks over his cardboard fleet of tiny working models.

SIDEWALK superintending can be inspirational!

Sixteen-year-old Tommy Hall is one spectator super who makes the most of his observations. He draws on-the-spot sketches which he later translates into full-scale construction plans. These he converts into realistic, working models—made of cardboard! Already, he's built tractors, trailers, dump trucks and cranes.

Tommy, who's an honor student at Plainfield (N.J.) High School, hopes to cop a scholarship to Princeton where he'll study astronomy. And just to prove that he's really serious about astronomy, Tom has already built a pasteboard telescope! •





Engineer Tommy, left, drives a pencil into the sand with his paper pile driver. Note the cotton steam pouring from the crane's boiler. Caterpillar tracks, above, were made by wrapping strips of corrugated paper around discarded cotton spools.

THIS MONTH'S

prize gadget

Beer-Can Firefighter

"FIRE, fire!" came the cry from the kitchen. A. O. Samuels, who was just returning for dinner from his job as president of Bostwick Laboratories in Bridgeport, Conn., dashed through his house without shedding his hat or coat. He found flames shooting up the curtains near the blazing stove while his wife searched frantically for the fire extinguisher. Knowing it was far away in the cellar, he ripped off his coat, threw it over the burning grease and tore down the curtains.

From that near-tragedy a Hero was born—the ever-handy firefighter Mr. Samuels developed for use against any type of fire. Even a child may put out a blaze with his can's 15-foot spray of carbon tetrachloride.

WIN $50

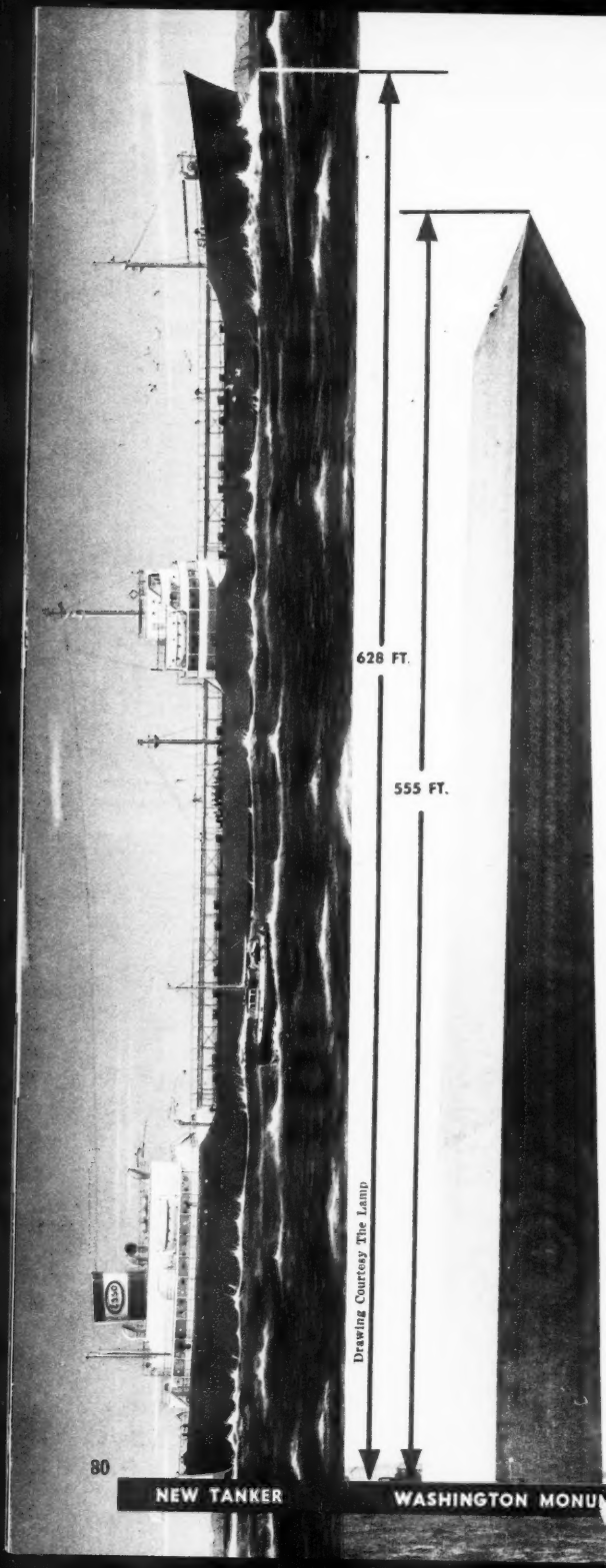
For designing a fine, lifesaving gadget and making a real Hero out of a beer-can, MI is three-alarming a hot $50 cash prize to Mr. Samuels. •

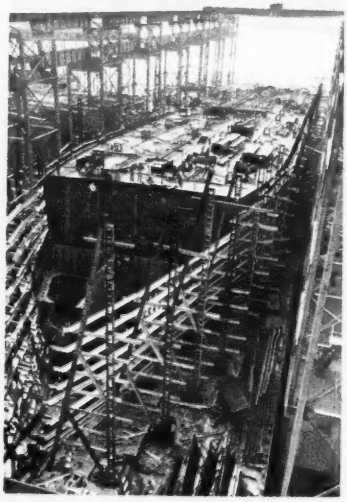
Think you're a good gadgeteer? If you've dreamed up some neat new gimmick, get busy and work it out in your shop. Then send pictures and a detailed description of your invention to The Gadget Editor, MECHANIX ILLUSTRATED, 67 West 44th Street, New York 18, N. Y. Each month the best entry, in the opinion of MI's editors, will be awarded a cash prize of $50. Got any bright ideas?

Yank the ring and a fast-acting jet smothers the flame. Below, Mr. Samuels watches as Bridgeport's Fire Chief Hayden uses the can to kill a blaze.

World's Largest Tanker

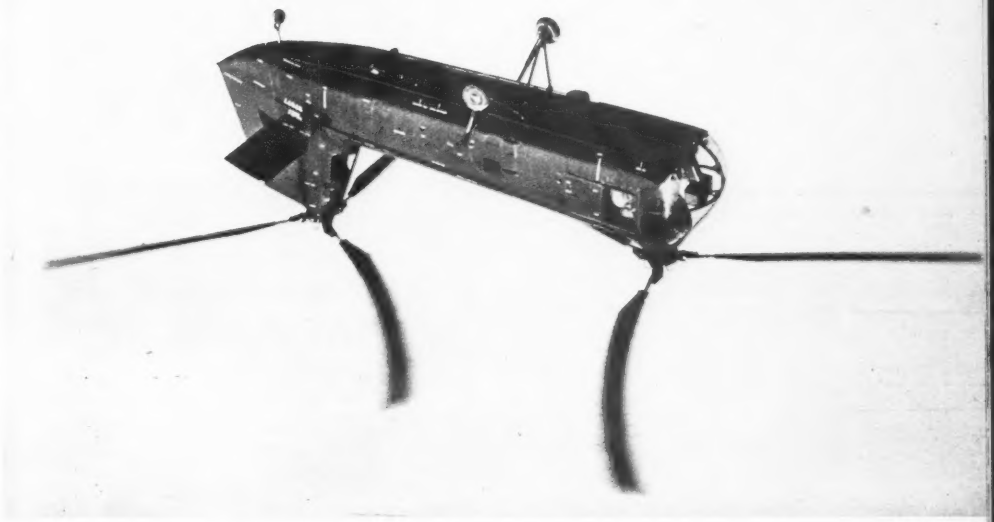
ENOUGH oil to overload a train of tank cars seven miles long poured out of the holds of the Esso Zurich when she glided into port recently at Bayway, N. J. Four steam-turbine pumps on Jersey Standard's new $5,500,000 tanker piped out the record load of 26,000 tons of Texas crude oil at 22,000 barrels an hour—twice as fast as other oilers had jetted their cargo. Sixty-three years of tankship design since the launching of the first true oiler, the German Gluckauf, went into this super-tanker, the biggest, most efficient oil transport ever built. The Zurich is the first of a fleet of 14 giant tankers that will help rid the East Coast of any fear of a fuel crisis, like the one that froze New York in 1947. •





Shipway at Chester, Pa., had to be made 100 feet longer to build the big tanker. If you stood the Zurich on its stern, the great oil-laden leviathan, far left, would top the Washington Monument by 73 feet.

Helicopter Loops the Loop



That old earth looks good to Ryan as he catches his breath in the new eggbeater's cockpit after his "impossible" loop.

ON the third dive of a strain test on the Navy's tandem-rotored helicopter, the Piasecki HJP-1, Pilot Jim Ryan applied full controls. The 131-mph craft snapped straight up on its tail. Jim, a veteran test pilot, quickly decided that his best bet to save both the windmill and himself was to whip on through a loop—even though engineers had told him no 'copter could take such a backbreaking stunt.

While Navy inspectors and company officials gaped in dismay from the helicopter plant's field at Morton, Pa., Ryan pulled the bulky eggbeater through a perfect loop.

"I'll admit I did some sweating during that loop," Ryan confessed afterward. "But the sensation was like any loop in a conventional plane. I'd do it again if I had the chance."

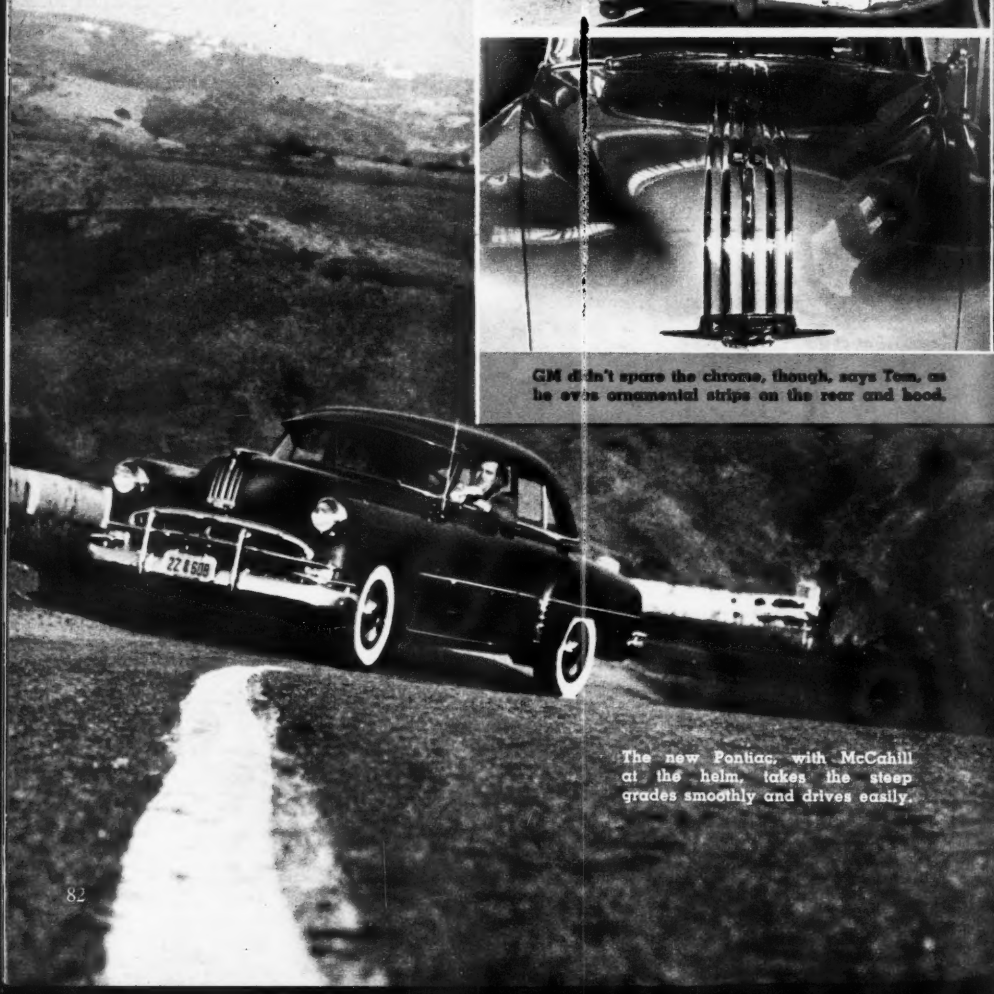
The helicopter showed no sign of damage after surviving the first known loop for a windmill. But the Navy isn't going to ask Jim to repeat that daredevil performance. •

The Navy's newest helicopter, HJP-1, wasn't designed for stunting but for rescuing pilots down at sea. Tandem rotors fold for stowage aboard ship.

MI Tests

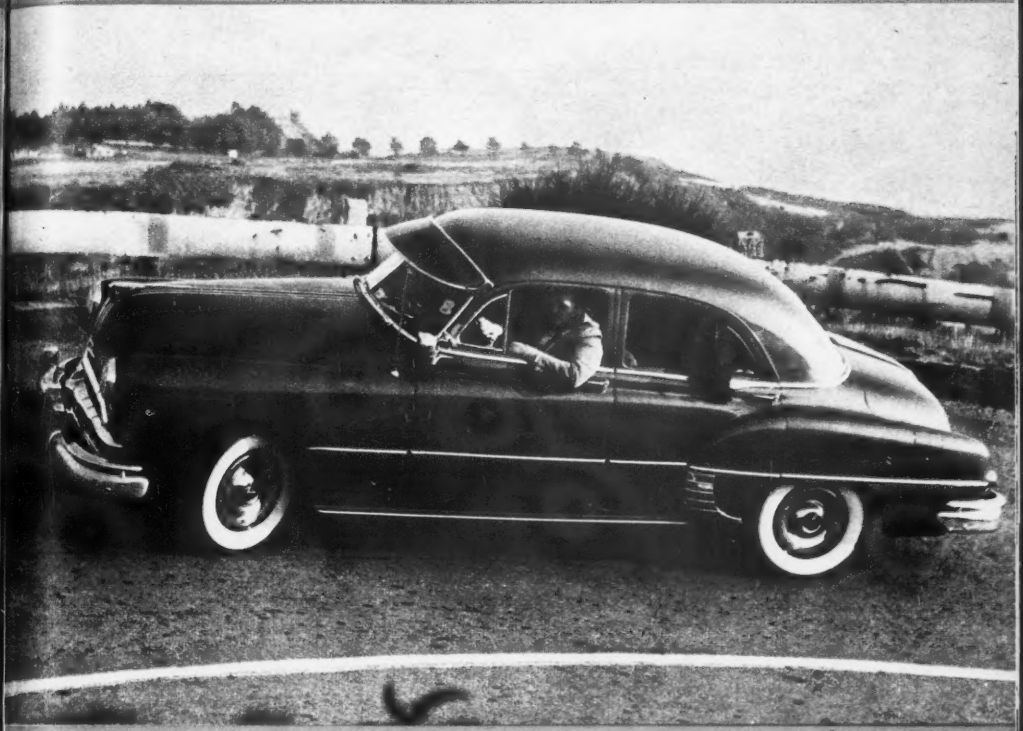
"The best Pontiac that General Motors has ever turned out," is auto expert Tom McCahill's verdict after giving this new car a tough workout over rough Southern California country.

GM didn't spare the chrome, though, says Tom, as he eyes ornamental strips on the rear and hood.



The new Pontiac, with McCahill at the helm, takes the steep grades smoothly and drives easily.

the '49 Pontiac



MI's auto expert finds that Pontiac's lines combine best of '47 Fleetwood Cadillac and Futuramic Olds.

THE 1949 Pontiac will undoubtedly be hailed as the best offering that division of General Motors has turned out to date. And it *is* just that!

For my dough, this new model just misses being tops in the looks department too, because it clings to some of the traditions of its adopted ancestor, famed old Indian chief Pontiac.

Here's what I mean—in silhouette this new offering incorporates the best features of the Cadillac Fleetwood body of '47 and the Oldsmobile Futuramic. Where the old chief's hand shows up is in the "decorative" chrome strips plastered all over the hood and tail like super-deluxe warpaint. I'm willing to grant that this is my own opinion and that there are many people around who like this sort of elegance. All in all, I think the Pontiac is a beautiful looking car.

A number of small additions make this a well-thought-out vehicle. The new instrument board is in excellent taste and the instruments are located so that you don't have to own a pear-shaped head to read them. In fact you don't even need a cyclops eye—something necessary in many new designs where the instruments are clustered behind the steering post. There's a new felt distributor lubricating pad as well as larger water pumps. Pontiac is also featuring a finger starter button on the dash in place of the former foot job. However this is just something they have been rather backward [*Continued on page* 162]

MI Tests

That road is rugged but the riding is easy as Tom whips the Coronet out of a mountain pass.

The 10,000-ohm suppressor in the distributor cap, far left, cuts out radio and TV static.

Tom got a kick out of the combination ignition lock and starter, left, a featured Dodge gadget.

Shooting the Coronet up a gravel path off Cold Water Canyon, Tom finds it's great on hills.

the '49 Dodge

It's easy to drive, easy to ride but a rugged goat on the hills—and a smarter, punchier car than the '48 model, Tom McCahill finds.

LOWER on the outside, higher on the inside, shorter on the outside, longer on the inside, narrower on the outside, wider on the inside—sounds like my own specifications of late only in reverse. But that, kiddies, is the big part of the Dodge story this year.

Dodge has made a number of changes since we tested the 1946 model. They add up to a very different car from the first postwar offerings. In spite of all the stuff about big inside, small outside, the new autos are still unmistakably Dodge in looks.

The '49 cars are far handsomer with their neat, clean lines. But there has been no radical break with past tradition, such as cars in the same price class, like Mercury and Studebaker, made. Even if you'd been locked up in solitary for several years, you could still spot a Dodge a block away.

In typical Chrysler Corporation fashion, the new Dodge comes in three different sizes: (1) the handy Wayfarer with a 115-inch wheelbase, (2) the 123½-inch Coronet and Meadowbrook series, this year's standard—and (3) a big economy size, the 137½-inch, eight-passenger sedan.

For my test, I was given a Coronet coach, the first coach model to arrive in Los Angeles. When I opened the door, I noticed it swung to a full 90 degrees, thus giving easy and safe-access. The upholstery is much superior to that of many higher priced cars.

A gimmick that I go for on the new Dodge is the combination lock and starter. You insert the key, turn the switch on, then push the key another notch to the right for the starter. I found, too, that I could lift the trunk bonnet with a single finger but that it takes two to put the bonnet down, since it is now counterweighted so that it pops up when you release it.

As I did with the other cars I tested for MI on the West Coast, I headed straight for the mountains. I was instantly impressed with the increased torque and punch as I started to climb.

The new engine, [*Continued on page* 165]

Atom Bombs For Sale—5¢

GOT a yen to drop an atom bomb? Well, just put a nickel in the slot and you can bomb heck out of a ripe target —all in the confines of a penny arcade.

Every time you put a coin into a fantastic-looking atom-bomb machine, you're feeding the brainchild of William Rabkin, head of the International Mutoscope Corporation. His company hires the nation's top electronic scientists to rig up the mechanical innards of atom bombers, jet planes, B-29's and even automatic letter writers.

Rabkin ships the awe-inspiring gadgets to arcade battlefields all over the nation. There, day after day, generals in mufti sink entire fleets and smash whole cities—all for 5c. •

Here's William Rabkin, nickel munitions king, originator of atomic warfare —penny arcade variety.

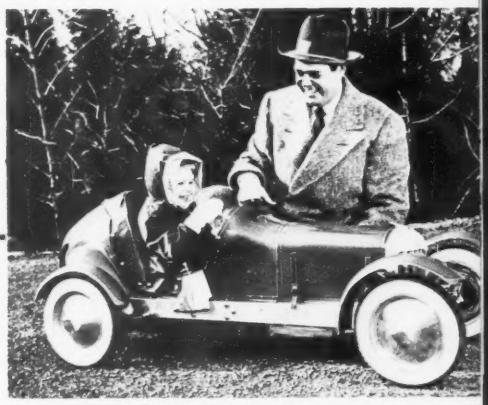
It's war! You pay your nickel, take aim and atom bomber (far left) will destroy entire cities for you.

For only 5c, left, you can imagine yourself gunner on a battleship shooting down all attacking planes.

NEW in SCIENCE

Safe Bike for kids between 3 and 7 years of age is the latest vehicle news. The addition of 2 small stabilizing wheels on the rear axle does the trick. Wheels are detachable. Made by Huffman Mfg., Dayton, Ohio.

Midget Car, below, is a present from James Melton, opera tenor, to his 3-year-old daughter, Margo. It is a cast-aluminum duplicate of a racer. It has a real motor (electric) which drives it 3 mph.



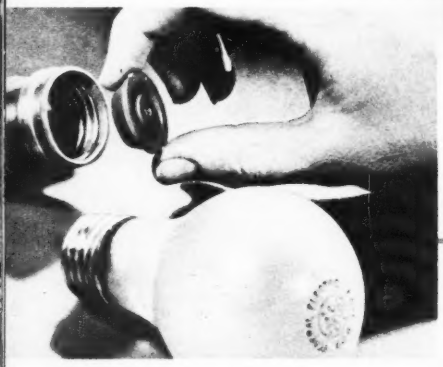
3-Wheel Scooter is a carrier designed for light, fast deliveries. Body compartments are varied to suit type of load. It has 3 forward speeds and reverse, choice of 12 motors. Lowther Mfg. Co., Joliet, Ill.

Sonic Glider, below, is controlled in flight by the Buck Rogers helmet on Stefan Olsen, 6, of New York. Batteries and an amplifier translate the oral signals into electric commands for the little plane.

Model Engine, developing 1⅓ hp and weighing only 13 oz, gives this little scooter and pretty 120-lb starlet Linda Mason the amazing speed of 8 mph. Made by Dick McCoy, Pomona, California.

NEW for the HOME

Electric Maid, right, does housework without a spark of protest. It shines shoes, scours pots, polishes silver—can't make beds, though. A ¼-hp motor sucks the dirt into a bag for easy removal. J. M. Glauser, Upper Warlingham, Eng.



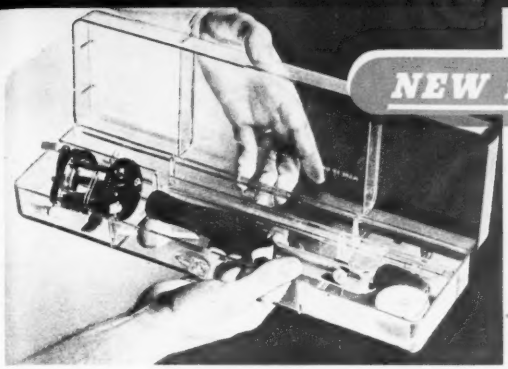
Shock Stopper, left, protects probing fingers from serious burns. It's an insert which is pressed into the socket and makes full electrical contact when bulb is in, but breaks circuit when bulb is out. Container Specialty Co., Cleveland.

Flush-O-Let, right, keeps toilet bowls clean without washing. The jar at left contains a chemical bag which lasts for six months. It's connected in tank between water pipes and overflow tube. Flush-O-Let, P. O. Box 66, Little Falls, New Jersey.

Table Stretcher, left, helps harried housewives serve extra dinner guests who just drop in. Gimmick consists of four tubes which raise card tables to level of regular dining room tables. Syland, 363 Victory Blvd., Staten Island, N. Y.

Breakfast Cold? If a cup of jaded java or a piece of dry toast spoils your day, here's the gadget for you (right). It's a serving tray with a radiant glass top, heated by electricity. It keeps food hot and won't burn you. Salton Mfg. Co., N. Y. C.

NEW for the FISHERMAN

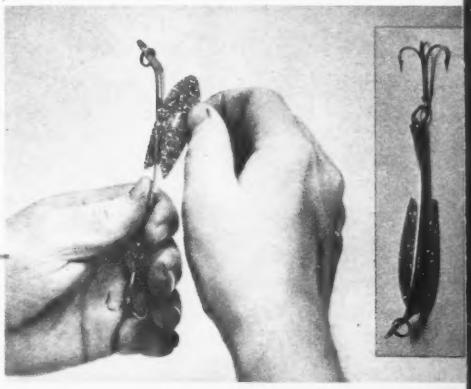


Plastic Tackle Box will please the fishermen, especially the salt-water boys. It'll float if dropped overboard (providing the contents aren't too heavy), can't corrode or mildew, and is unbreakable. Ocean City Mfg. Co. Phila.

Sport Life Jacket below, can come in handy when the water gets too rough. The hidden, Vinylite air compartments, extending over the chest and around the neck, are inflated quickly by mouth and closed with a built-in valve. Neptune Specialties, Brooklyn.

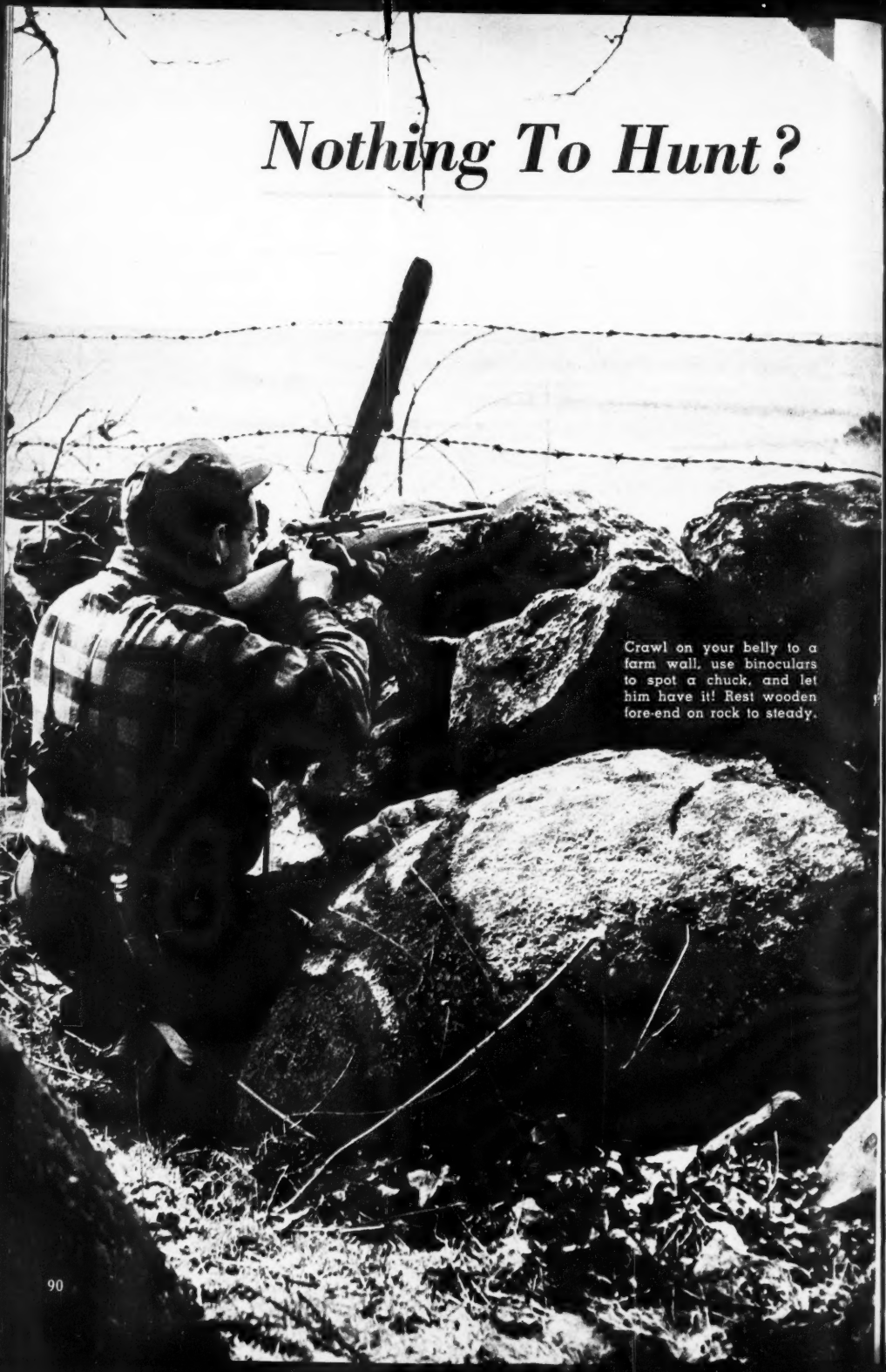
Folding Knife uses its handle as a sheath. Modeled after the Philippine gangsters' Batangas knife, this peaceful variety is for fishing and hunting. Safety catch locks it open or closed. Waltco Products, Chicago, Ill.

Fishing Kit, below, contains two items usually forgotten or ignored by fishermen. A thermometer is necessary to tell depth of fish and whether they'll bite. Waterproof match box has compass in its top and striking bar. Taylor Instrument Cos., Rochester, N. Y.



Multilure Wobbler has ten, colored-plastic fins which can be interchanged in a few seconds to suit the fish's fancy. They snap in and snap out. Lure's action won't twist your line. Boyd Hayden & Co., Watertown, Mass.

Nothing To Hunt?



Crawl on your belly to a farm wall, use binoculars to spot a chuck, and let him have it! Rest wooden fore-end on rock to steady.

Try Varminting!

Stalk the wary woodchuck or crow with a tiny, high-speed bullet and a telescope-mounted varmint rifle.

By Raymond Camp
Gun Editor, New York Times

THE good old hunting days are gone forever. Let's be honest! There are just too darned many hunters for the game available.

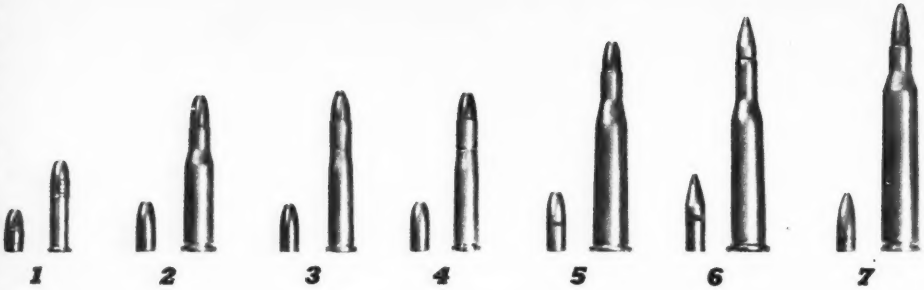
When grandpa was a boy the woods and fields were swarming with birds, wild ducks were so numerous they were a menace to his crops, the same with deer . . . but what a difference just a few years has made. Our open seasons for upland birds have been cut to days . . . just a couple in New York State last year. We have an average of a month for migratory fowl, and the conservation boys are keeping a mighty close watch on our deer population, too.

We can't truthfully say that there is a scarcity of game; in many areas game is just as abundant as ever. But there is a *comparative* scarcity . . . just not enough to satisfy all the guns looking for it. Well, what is there for us to do? Will we have to put the old shooting iron in mothballs?

Grandpa wouldn't waste his powder and shot on a woodchuck or a crow. They were just "varmints" to him. He'd set his sights on them only when they became too pestiferous. Now these selfsame varmints, including hawks and foxes, ignored by hunters for many years, are providing you with an opportunity to unlimber your cannon and get out in the woods once more. There is no closed season on them, and no bag limit. You can hunt them whenever you feel like it, and to your heart's content. They're even warier than most of our popular game and offer a greater challenge to your skill and stalking ability. Edible, too. Roast woodchuck is being endorsed by an ever-growing group of gourmands, and you would be surprised to see one of those "Southern quail" before the chef stripped off its black feathers.

You can hunt your varmints with anything from a .22 to a big-game rifle, but if you want to do it the right way . . . if you want to be a real "varminter," the best thing to do is to get yourself a rifle just for the purpose, or see to it that your present one is rigged accordingly. The ideal rifle should be lightweight with a small but high-velocity bullet and should be equipped with a good scope.

The varmint rifle and its load was developed by the boys-in-the-back-room

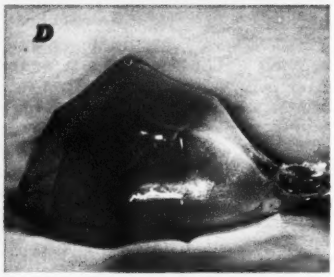


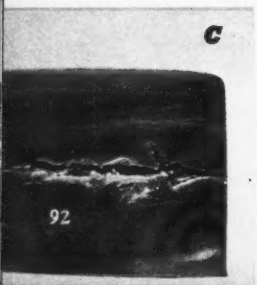
KEY TO BULLET SIZES

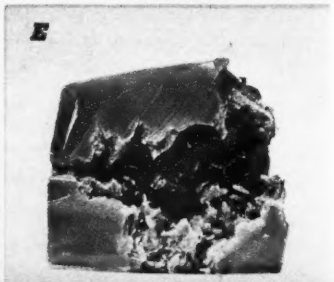
1: 22 Long Rifle
2: 218 Bee (46 gr.)
3: 22 Hornet (45 gr.) (Soft Point)
4: 22 Hornet (46 gr.) (Open Point Expanding)
5: 219 Zipper (56 gr.)
6: 22 Savage (70 gr.)
7: 220 Swift (48 gr.)
8: 250 Savage (87 gr.)
9: 25-20 Win. (60 gr.)
10: 25-35 Win. (117 gr.)
11: 257 Roberts (100 gr.)
12: 270 Win. (100 gr.)
13: 32-20 Win. (80 gr.)

How expensive can you get? This Mashburn job with a Farquharsen action costs up to $400.

In Winchester's tests of small-caliber bullets, a 3" cube of gelatin (A) was used. In B a 22 Long Rifle Hollow Point bullet (37 gr.—muzzle velocity: 1400 ft. per sec.) has hit the block. Result is shown in C. In D a 220 Swift (48 gr.—muzzle velocity: 4140 ft. per sec.) has caused greater damage (E). Photos were taken at 3 millionths of a second.







together with the technicians of the arms companies. They were looking for a cartridge that would be extremely accurate at ranges up to 300 yards, and would deliver a solid punch at the same time. The results of the amateurs' experiments were occasionally fatal, but in many instances the individual involved would have met an untimely end sooner or later by some other form of fool-killer. The cartridges that thus emerged were termed "wildcats," and many of the very popular loads used today began their existence as wildcats, eventually to be tamed and quieted down for general use.

Charles Newton, one of our greatest designers and ballisticians, was really the father of the small-caliber-high-velocity trend. He evolved a .25 caliber cartridge with an 87-grain bullet that had the surprising velocity of 3000 feet per second. This was away back in 1908, before powders had attained their present state of perfection.

Continuing his experiments, he developed a .22 caliber bul-

EXCLUSIVE photos courtesy Western-Winchester

Winchester Model 70 in 220 Swift with 10-power Unertl scope is one of best.

Winchester Model 43 is a new, inexpensive model in 218 Bee, 22 Hornet, 25-20, 32-20.

let in a center-fire cartridge, which had such promising features that it was taken up by Savage, who christened it the "Hi-Power." It was not until 1930, however, that a number of ardent experimenters and gun cranks really devoted their time to the possibilities of the high velocity small caliber cartridge, and then the wildcats began emerging right and left.

It was about this time that my own favorite varmint load made its appearance—the .220 Swift. This cartridge was developed by Captain G. L. Wotkyns, who necked down a .250 cartridge case to fit a 46-grain .22 bullet. Wotkyns wanted to get a light, accurate bullet that would travel at 4000 feet per second and he accomplished even more than he had anticipated. The results interested Winchester, and the experiments continued, with a 48-

Most farmers will let you hunt 'chucks on their land since these little animals dig holes which break legs of cattle.

grain soft-point bullet finally emerging as the best form for the load, and having a muzzle velocity of 4140 feet per second.

Compare this velocity with that of the ordinary .22 long rifle bullet of 45 grains, which has a muzzle velocity of 1400 feet per second and you have some idea of the increased speed and punch of the new bullet.

The .220 surprised everyone with its amazing accuracy and very flat trajectory. And it had another factor that gave it great appeal to the varmint shooter: when it plunked into a woodchuck, prairie dog or crow, it was as merciful as a bolt of lightning. AND, there was no possibility of a ricochet. The bullet, traveling at extremely high speed, went to pieces on impact. There was no danger of a glancing bullet killing a human or a cow a half-mile distant. I have seen this bullet kill a woodchuck instantly after a hit in the leg. In almost every instance the shooter is assured of a clean kill or a clean miss. There seems to be no middle ground.

If you want to see what this bullet can do, locate someone with a Swift and try this experiment. Take an ordinary tomato can, fill it with water, and set it on a block. Walk back 50 yards and put a bullet into the can. Then try and find the can. It seems to explode in thin air.

Although the Swift is the fastest of the varminters now available in factory models, there are several wildcats being turned out by gunsmiths throughout the country that pass the 4000 feet per second mark. In addition, there are a number of other varmint calibers turned out by the various arms companies. While they are of lower velocity, they are definitely much safer than many of the wildcats. The velocities developed by these wildcat gunsmiths are, in some instances, extreme, but it is not the velocity which brings danger to the shooter—it is the breech pressures generated to give the velocities. Even the fine steels employed in some barrels can withstand only so much pressure, and since few of the wildcat producers do business on a scale which would warrant the expenditure for a pressure gun, most of them are working in the dark. Eventually one of them will add just one grain too much to the powder load.

But let's look at the *recognized* varminter field. There are a variety of interesting cartridges available, each of them with a host of adherents.

The .218 Bee is one of the most popular, and is turned out by Winchester as well as by several individual gunsmiths. The Bee has a modest velocity, 2860 ft. per sec. with 45 gr. bullet, and is popular with squirrel hunters as well as dyed-in-the-wool varmint hunters. It can be turned out in a lightweight rifle, which adds to its popularity.

The .219 Zipper, which also has a big following, has a larger bullet, weighing 56 grains, and is 200 ft. per sec. faster than the Bee. It does an excellent job on woodchucks and crows up to 200 yards, and like the Bee is turned out by factory as well as individual gunsmiths.

Of all those listed above, however, undoubtedly the .22 Hornet takes first place in popularity, possibly because of its availability over a period of years in inexpensive factory models. The Hornet has real accuracy at 100 yards, and as the average varmint shooter does a good part of his shooting (accurate shooting) at this range, there is reason for the rifle's popularity. Another item which cannot be ignored is the price, for Hornet cartridges are cheaper than any of the other popular varmint loads. The bullet, which is available in 45 and 46 grain weights, has a muzzle velocity of 2650 ft. per sec.

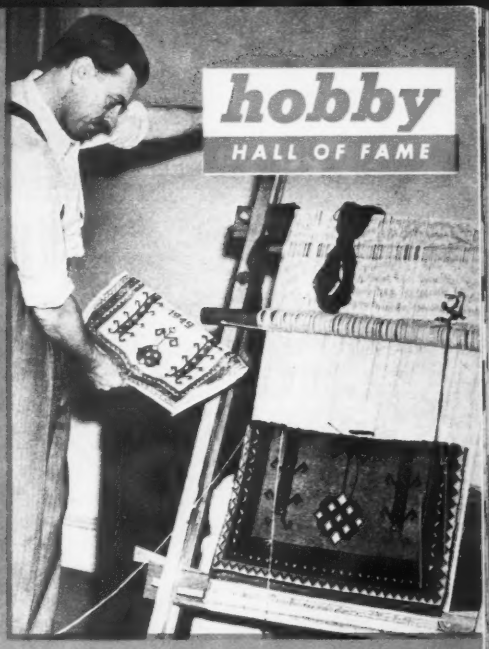
The rest of the field can be given briefly; it takes in the .250-3000 Lovell, .22 High Power, .22 Varminter, .25-36 Marlin, .25-35 Winchester, .25 Remington and the .25-20 Winchester. All of them are available in factory models, and most of them will be turned out, on order, by the individual gunsmiths.

While some of these varmint rifles are used on larger game, I have never been able to follow the reasoning of those who contended that they were "more sporting." In the hands of the average shooter, most of them, with the possible exception of the .250-3000, are decidedly "un-sporting," for they will wound more game in the deer class than they kill. These loads are designed primarily for animals in the woodchuck size classification, and some prove inadequate for coyote shooting. In the hands of an expert marksman, an ordinary .22 long rifle load is adequate for a deer, but unhappily not every shooter can qualify under this category.

There are two extremely popular loads today, however, that serve admirably for varmint as well as big game hunting. They are the .270 and the .257 Roberts. These two loads have soared in popularity during the past two years.

The .270 undoubtedly tops the list in popularity today, and it is a really remarkable cartridge. The varmint shooter will prefer this cartridge with the 100 grain pointed bullet, which has a muzzle velocity of 3540 ft. per sec., and a trajectory that shooters describe as "pancake." This same cartridge will be adequate for deer and antelope, but for larger game the 130 grain bullet (3140 ft. per sec.) is preferred. With this load, many shooters have put down deer, elk, moose, caribou, and a number of Alaskan brown bears, the tops in our big game list on this continent. A num-

[*Continued on page* 97]



Thomas L. Thomas—Warbler & Weaver

SOME singers *cut* a rug—but not radio and concert artist Thomas L. Thomas. He *makes* 'em!

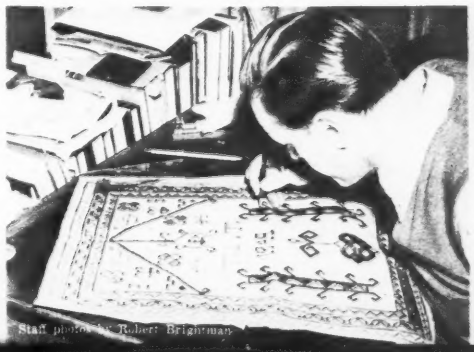
Warbler Thomas has taken up Oriental rug weaving as a hobby in order to keep himself relaxed for his numerous concert engagements. Aside from lots of patience and plenty of time, Thomas claims all you need to engage in this hobby are a needle, a loom and a variety of wool threads.

In the three years that he's practiced his rug-making ways, Thomas has turned out three beautiful Oriental-type specimens. But color as well as design distinguishes a fine Oriental rug and so Thomas carefully checks his wool with ancient masterpieces.

In the course of his rugmaking, Thomas has also become familiar with much Oriental culture closely tied in with the rugs. For instance, he's learned that those with an apex design are faced East by the Moslems when they're used for prayers.

One of the most relaxing aspects of his hobby is that Thomas has found he can sing and weave at the same time—so he does a great deal of his practicing at the loom. And judging from the enthusiastic audience response to his NBC broadcasts and concerts, Hobby-Hall-of-Fame winner Thomas L. Thomas has also earned a permanent niche for himself in the Concert Hall of Fame. •

Personalized rug, with his own initials, takes a bit of careful designing on the part of weaver Thomas.

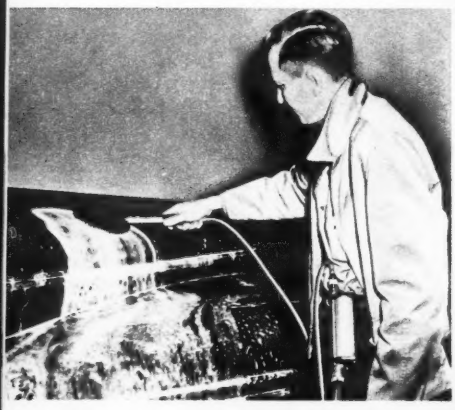


Staff photos by Robert Brightman

Warp, woof—and now a warble! Hobbyist Thomas sings while he works on his latest Oriental rug.

NEW on the ROAD

Radar Cop scares motorists into safer driving by keeping a record of their speed. It's a little black box which contains an ingenious radar device to measure the velocity of passing autos. Another cop (human variety) transmits license numbers of offenders to an officer down the highway who issues the summons. Right now it's busy trapping Connecticut lawbreakers. Eastern Industries, E. Norwalk, Conn.



Master Washer does away with bucket-of-suds method of cleaning cars. It's a turbine-driven brush with an automatic device for injecting liquid detergent into pressure water line. Master Specialty Co., Minneapolis.

Kiddie Kar Kot beds down the tots while you're on the road. It's a portable bunk which fits from the back of car to the back of front seat so the kids can't roll off. If you're really lucky, they may even fall asleep. Koneta Products, P. O. Box 21, Wapakoneta, Ohio.

Rear Windshield keeps the dust out of the eyes of passengers in open convertibles. It's a Plexiglas shield which won't interfere with raising or lowering the top or side windows of your car. Tonno-Shield Corp., Detroit, Michigan.

Nothing to Hunt?

[*Continued from page* 94]

ber of shooters have taken the .270 to Africa, and although they report it turned in an excellent performance, the veteran rhino, lion, tiger and water buffalo hunters say they prefer a larger caliber and heavier bullet for this shooting.

The .257 Roberts is now running the .270 a close race in popularity, and with good reason. The 100 gr. bullet, at 2900 ft. per sec., provides real accuracy, a flat trajectory, and plenty of punch when it hits. In an 87-grain load (3220 ft. per sec.) it makes an excellent varmint cartridge, which can be used on deer and antelope with good results. It is also available in a 117 grain bullet (2630 ft. per sec.) for big game.

Varmint shooting, as practiced today, calls for something more than an accurate rifle and a satisfactory cartridge. There is little use in having a rifle that will roll a woodchuck at 200 yards if you are unable to hold *fine* enough to make a hit. A 'chuck is a small mark at that range when you are using iron sights, so the modern varmint shooter equips his shooting iron with telescope sights ranging in strength from 2½ to 20 power.

The shooter who uses the .270 or .257 will limit his optical aid to one of the light, internal adjustment 'scopes ranging from 2½ to 4 power, but many who use their varmint rifle solely for varmints, go in for the high power scopes. With them, it must be admitted, finer shooting is possible in the event the shooter fires from the prone position or from a rest.

In the internal adjustment scopes now available, there are several excellent makes in powers ranging from 2½ to 6 power, these include: Lyman, Leupold, Edwards, Texan, Weaver, Fecker, Unertl, and Stith. In addition to these, Bausch and Lomb have just come out with a new hunting scope that should be extremely popular. The scope is in 2½ power and converts to 4 power by a mere twist of a knurled band. The elevation and windage adjustment is in the scope-mount, an extremely low mount which rests on top of the receiver. Like other hunting scopes, it is removable without changing the zero.

For those who concentrate on vermin shooting, the Lyman "Targetspot" in 8, 10, 12, 15 or 20 power is undoubtedly the finest available. This scope is adjusted for elevation and windage in the mounts, but cannot be removed without affecting the zero.

Landowners who are inclined to frown on the hunter who asks permission to hunt big game or upland game on their covers, change their attitude when the same hunter appears in search of woodchucks or crows. The actual damage done by the woodchuck, in normal circumstances, is small, but most farmers view him as just one more pest that they can do without.

The 'chuck always was a wary animal, but increased hunting has added to his native caution, and it takes considerable skill in stalking as well as good shooting at varied ranges to bring consistent success to the hunter. The first requisite is a pair of good binoculars, for without them it is extremely difficult to locate a 'chuck once the grass has reached a few inches in height. A spotting scope is substituted for binoculars by some shooters.

The average varmint hunter is something of a rover. He will drive the back country roads in his car, halting at every turn to make a careful survey of the rolling pasturelands on either side. Once a 'chuck has been located, or if the shooter can spot a few burrows, the problem then becomes one of patience and planning.

The woodchuck may feed on the succulent grass as much as 30 or 40 yards from his burrow, but you can depend upon it he has selected a feeding area that gives him a view of adjacent terrain. At regular intervals he will sit up and survey the area, and it takes little to send him scurrying for the mouth of his burrow. Once a 'chuck is located, the smart shooter will look over the terrain and decide the route he must follow to reach a point within reasonable range, and still keep below the line of the 'chuck's vision. Often this is quite a job, but never is it a dull one.

Once arrived at his shooting point, the hunter must make a slow and careful check to insure his quarry is still there. Then he must make an estimation of the range in order to know just where to hold. At this stage, it is important that the shooter know everything possible about the trajectory of his rifle. Normally, the 'chuck shooter will have his rifle zeroed at 200 yards, which means he must know how much lower to hold if the 'chuck is at 150 yards and how much higher if he is at 200. Then the rifle must be lined up on the quarry with a minimum of movement on the part of the shooter. A good trick is to rest the wooden fore-end of your rifle on a stone or against a tree. Not the barrel; it'll spoil your aim.

Sounds easy, doesn't it? But don't be misled; your varmints aren't saps by any means. They'll test all your skill and marksmanship. Give them a try and you'll see what I mean. It's great sport. •

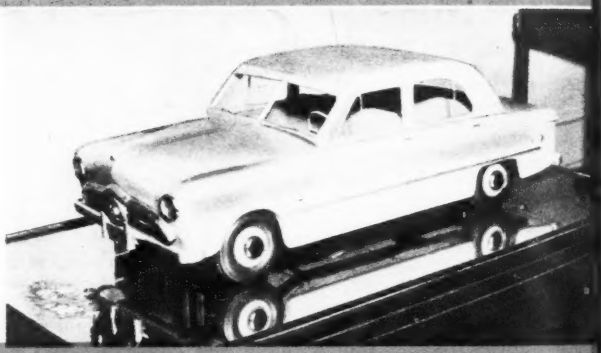
CRAFTS and HOBBIES

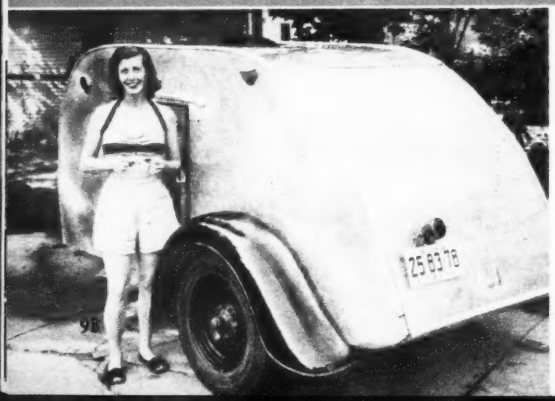
Workbench Award Winners...

THE proud builders of each project pictured this month are five dollars richer and also have our beautiful Workbench Award Certificate. Their entries were chosen, as the best submitted for the month. Why not send us a few photos of yourself with your project? If judged one of the best received during the month we'll publish your picture, send you a five dollar check and a Workbench Award Certificate. Enclose sufficient return postage and mail your entry to: **WORKBENCH AWARDS, MECHANIX ILLUSTRATED, 67 West 44th Street, New York 18, N. Y.**

Chevrolet's All-American Soap Box Derby has gained so much recognition, building and racing these cars has developed into one of the leading hobbies of today's youth. Herbert Jackson of Petersborough, Ontario, Canada, built this fine car. "I made this racer," writes Herbert, "from MI plans and was fortunate enough to win silver cup, bicycle and fishing rod in a local race here last summer." If we didn't know these racers coast down hill, we'd think this job was powered with a gas engine—using Kendall gas and oil too!

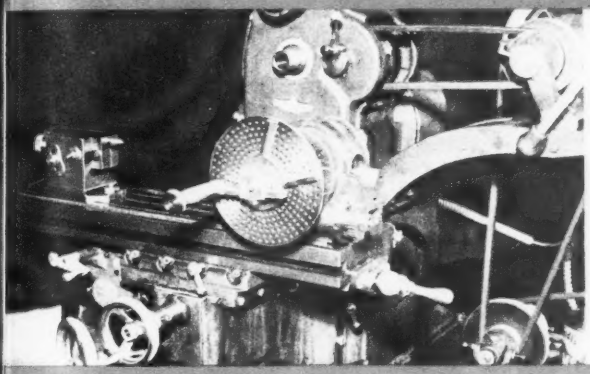
George Horner, of Williston Park, Long Island, N. Y. built this spiffy model of a 1949 Ford sedan. "I drew my own plans from dealer literature," writes George, "and in about a month I finished the project. I copped first prize last September at the Nassau County Mineola Fair. The length is 22 inches, the interior is upholstered and even the tires are filled with air."





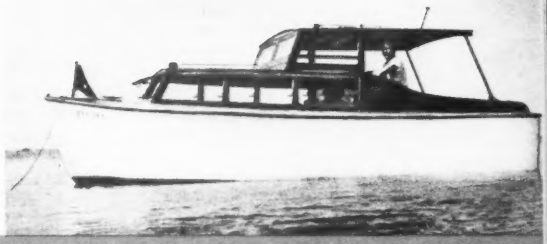
Of the thousands of MI readers who have nothing but praise for the "Trailer for Two" (Sept., 1947 MI) Gordon C. Graham of Detroit, Michigan, is one of the most ardent boosters. Writes Graham: "My wife and I recently completed a 9000 mile trip covering most of the points of interest west of the Mississippi. Driving offered no special problems. My Olds easily pulled this 700-pound trailer, which cost about $350 to build. Our sleeping costs for this six-week trip totaled eleven dollars!"

E. E. Jackson, PhoM1c, of the Naval Air Station in San Diego, California, built this realistic Nieuport Scout control-line job from Cal Smith's June, 1947 MI article. Writes Jackson: "The model flies very well with an Arden .099 engine, but I plan to install a Forster 29 when I compete in the stunting events. At the writing I have logged well over two hours of actual flying time and have developed into a rabid World War I model fan."

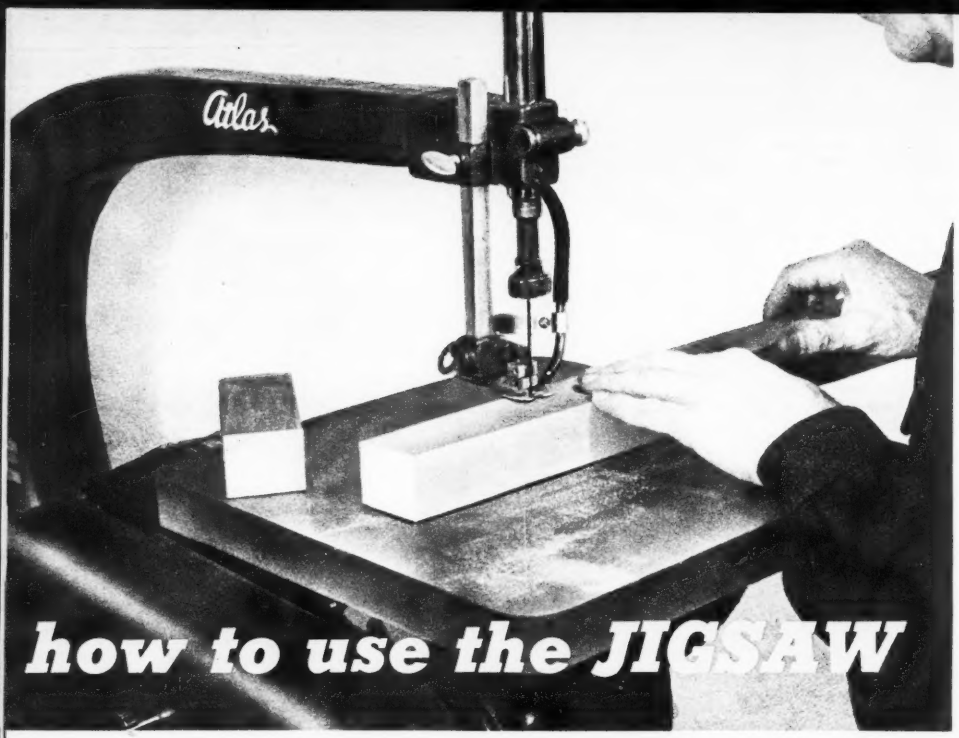


Metal working fans will recognize the attachment mounted on the bed of this Atlas milling machine as a dividing head. Lawrence Smith of Washington, D. C., who built the project and snapped this pic writes: "To make this dividing head I first made the patterns and then had iron castings made. Of course, I did this work with the aid of a standard dividing head borrowed from a friend." Nice job, Larry, that certainly is a valuable addition to any home workshop.

Cruise-Mate, MI's Plan No. B-144, has always been a top choice for amateur boat builders. Contrary to what one may think when looking at photos of this design, the engine is an outboard mounted in a well —one of the reasons why this Crosby design is so popular. Levi Pratt, of Pratt's Garage in Erie, Pennsylvania, writes the following: "Here is a picture of my modified Cruise-Mate in the water with me aboard. I enjoyed building this project; every boating fan should build one."



From Camden, New Jersey, W. E. Lehrberger sent us this photograph of his Little Giant boat built from MI Plan No. 910. Lehrberger writes: "Here is a picture that represents three months of enjoyable spare time. This was my first attempt at boat building—and I'm more than satisfied. The plans were easy to follow, despite the fact that I had only a few hand tools to work with. Needless to say, I'm a boat fan now and plan to build a larger one. From MI plans, naturally!"



how to use the JIGSAW

Too often thought of as a mere toy, the jigsaw in reality is one of the more versatile power tools.

By John P. Arnold

IT'S no task at all to whip up an air-tight case before any craftsman's jury for the jigsaw (sometimes called the scroll saw) as a favorite power tool.

While it was not intended to do the work of a circular saw or bandsaw, it can sub for either in many operations. But the number one feature of this power tool is its ability to cut fine decorative curves, especially "inside" curves which are started by first drilling a hole in the stock, inserting the removable blade and then cutting in the regular manner. Metal, plastics, fiber, etc., can be also cut when special blades are used. In addition, files and sanding sticks can be quickly chucked to convert your jigsaw into a filing machine or fine sander.

Anyone can learn to operate the jigsaw with a minimum of practice. It is safer to use than most other power tools. Provided the most elementary precautions are taken, the average 12-year-old can be allowed to handle it. Thus it is the ideal tool for teaching youngsters the rudiments of craftsmanship.

These are just a few of the considerations which suggest that the jigsaw is an all-around machine, a small workshop in itself, and one of the first power tools the budding craftsman should buy.

Ideally, you should obtain a heavy-duty jigsaw powered by a ⅓ to ½-hp. condenser or repulsion motor. By using multiple pulleys, it'll be capable of speed variations from 570 to 1,660 r.p.m. This is necessary in order to work various materials. Such a saw is of the reciprocating-plunger type, is splash lubricated, has a 24-in. clearance from saw blade to back, and can take material up to 2¼ in. thick.

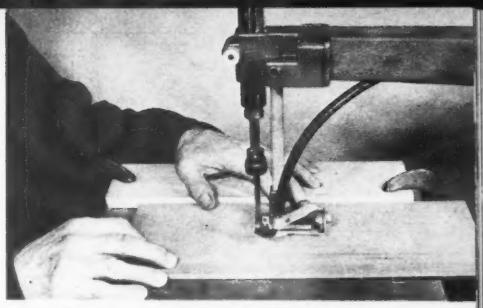
It is a simple procedure to set up the machine. The various controls are shown in the accompanying illustrations. The drive belt is placed on the pulley step that will give the correct sawing speed for the material you're working. In general, work soft materials at high speeds and hard materials at slower speeds. The correct blade is selected for the type of work and inserted vertically in the flat jaws of the lower chuck. The squared end of a scrap of wood will aid in setting the blade at right angles to the table. The plunger is then raised to its highest point (by turning the pulley by hand) and the free end of the blade is clamped in the jaws of the upper chuck.

Tension is adjusted by pulling up on the spring housing and securing it with the knurled knob at the right side of the overarm.

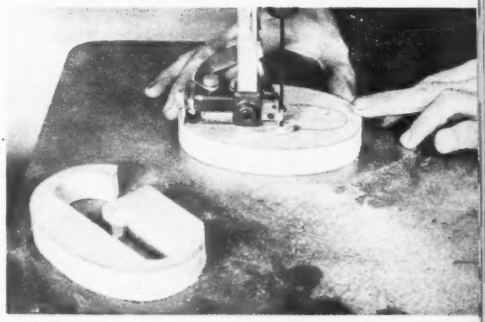
The purpose of the hold-down is to prevent the work from being raised from the table during the upward stroke of the saw blade. Blade guides and a blower to clear sawdust away from the line of cut are carried on the upper shaft. The roller guide should be adjusted to bear lightly against the back of the blade and the slotted guide should be taken up to prevent side-twist. Both guides must be adjusted so the slot does not project beyond the gullets of the saw teeth—this would quickly ruin the blade.

Saber blades are mounted somewhat differently, being held only in the lower chuck. This saves considerable time when making inside cuts as it is unnecessary to release the blade from the upper chuck to insert the stock.

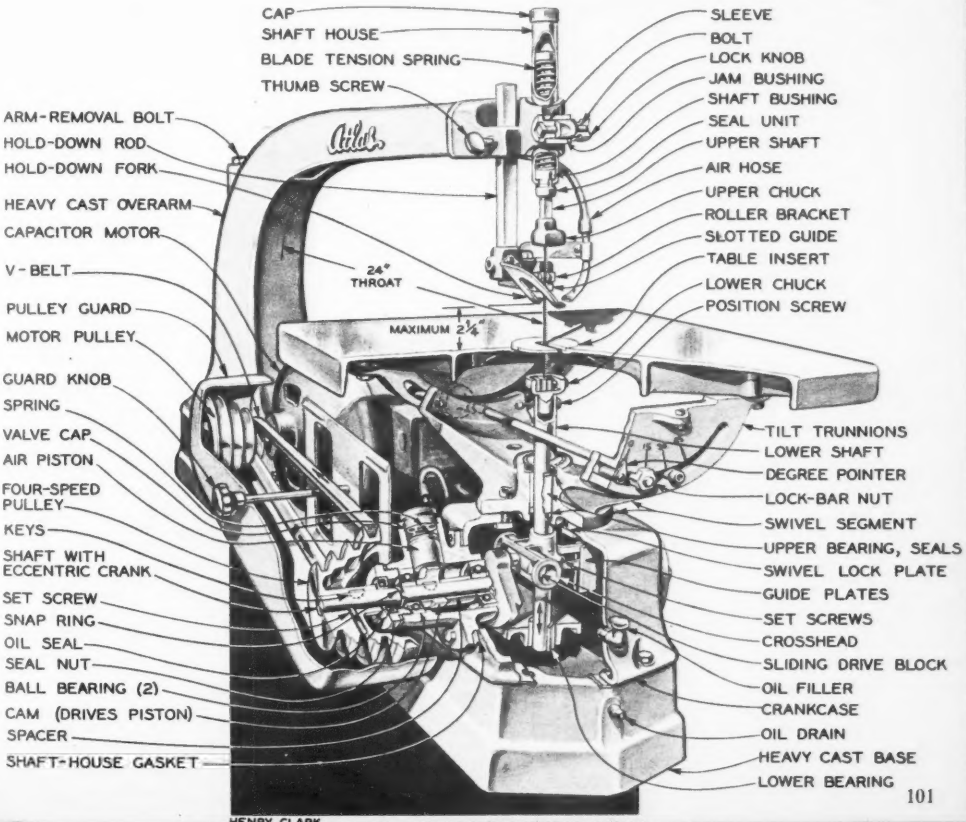
Files and small sanding drums having ¼-in. shanks can be held in the V-jaws of the lower chuck, converting the jigsaw into an efficient tool for finishing the edges of wood or metal after they have been sawn roughly to [*Continued on page* 103]



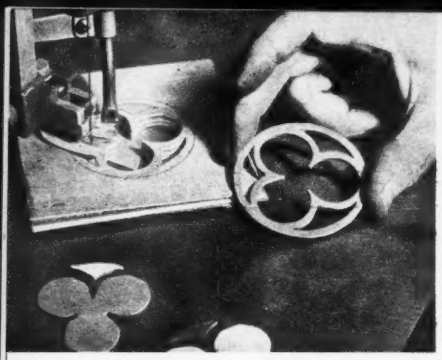
A wooden fence clamped to the saw table is often useful when ripping pieces of lumber to a width.



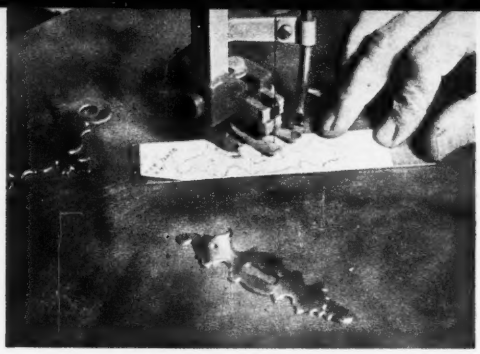
Cutting raised letters for signs out of wood or metal is a typical job for which jigsaw is used.



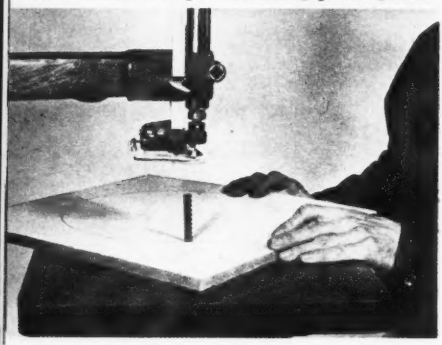
HENRY CLARK



To saw several duplicates from cardboard or cloth, sandwich layers between plywood pieces.

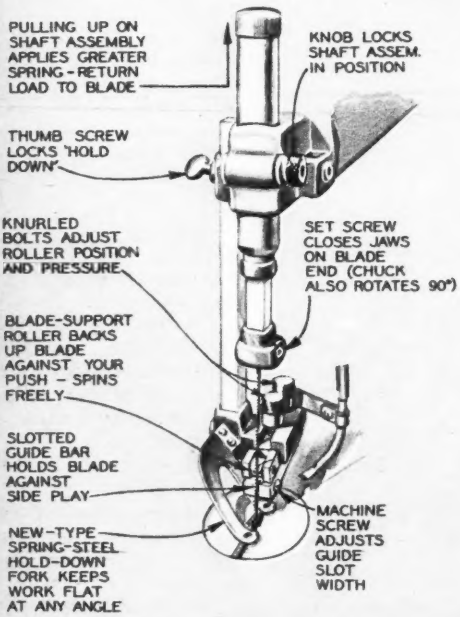


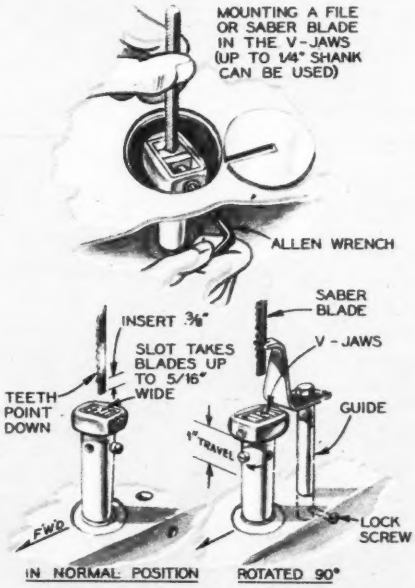
Cabinet hardware, such as drawer-pull escutcheons and key plates, is easily cut on the versatile saw.



When using a saber blade, the upper chuck and hold-down are raised entirely out of the way.

For precision filing of delicate fretwork in metal, use a file clamped in the V-jaws of the lower chuck.





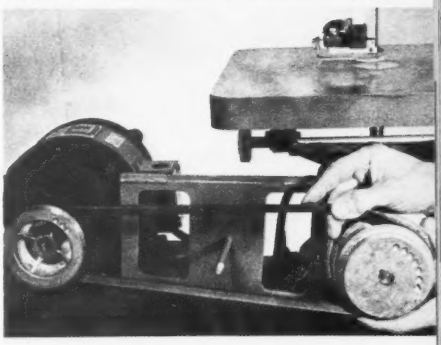
LOWER CHUCK TAKES SUSPENSION BLADES, SABER BLADES, FILES, AND ABRASIVE STICKS

shape. The work table can be tilted 45° to the right and 15° to the left for bevel-sawing. Furthermore, the table, the hold-down, and both chucks can be rotated 90°. This allows ripping long boards and makes it possible to saw down the center of a 4-ft. width of wallboard without removing the overarm. And, to give the tool unlimited capacity, the overarm can be removed.

There is a certain knack in operating a jigsaw to produce the best results. The pattern is usually marked on the stock with a pencil and the work is guided freehand to follow the lines. The work must not be forced into the saw blade or twisted violently. The best method is to feed slowly with one hand while the other rests on the table to serve as a guide. A wood rip fence can be clamped to the table when ripping a number of pieces to a set width. Fine jeweler's blades will turn abrupt corners, but wider, thicker blades require different techniques. Either saw out into waste material or bore holes in the angles, as shown.

Although a light jigsaw doesn't have the capacity for cutting heavy stock, a heavy-duty job using a coarse blade will bite through 2x4's or similar stock with ease. All in all, this is a useful tool for any craftsman—a tool that will eventually pay for itself in time saved and completed projects. •

Small sanding drums can be used to smooth the edges of woodwork prior to painting the piece.



Four different saw speeds are obtained merely by shifting drive belt on the step pulleys.

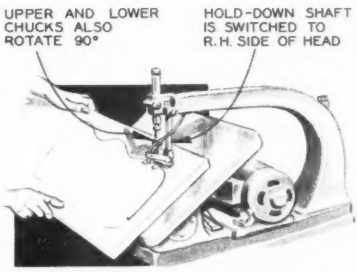


TABLE ROTATES 90° TO PERMIT CUTTING LONG STOCK EVEN WHILE TILTED TO 45°

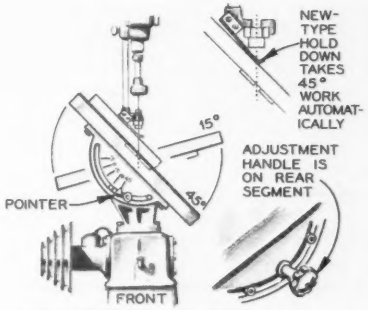
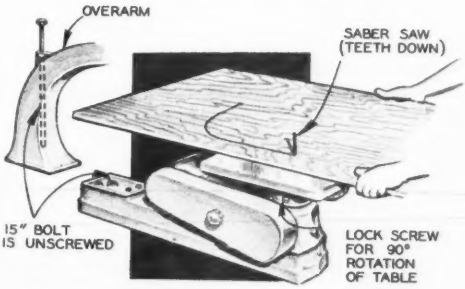
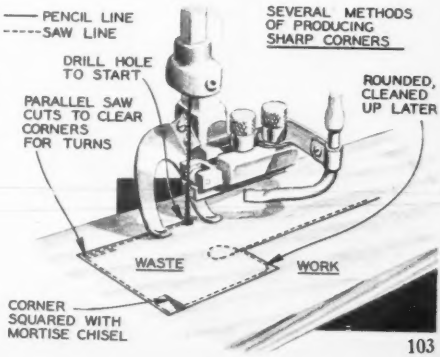


TABLE TILTS 45° TO THE RIGHT AND 15° TO THE LEFT



LARGE PANELS ARE CUT WITH SHORT SABER SAWS BY REMOVING OVERARM



Your New Home Needs

Here they are—the 50 basic facts every housebuilder or buyer must know to assure himself of getting a well-built, trouble-free home.

By Robert Scharff

PART I

JUNE sees the building industry rolling along in high gear. New houses are springing up everywhere. Countless prospective buyers, trailing along in the wake of thousands of eager real-estate brokers, are inspecting potential homes of all sorts—brand-new ones and old ones, big ones and little ones, expensive ones and cheap ones.

Why is it that one house may sell for $8,000 while a similar one in the same locality brings $10,000? The answer is quality of construction. The cheaper house is probably flimsily put together while the other is well built and substantial.

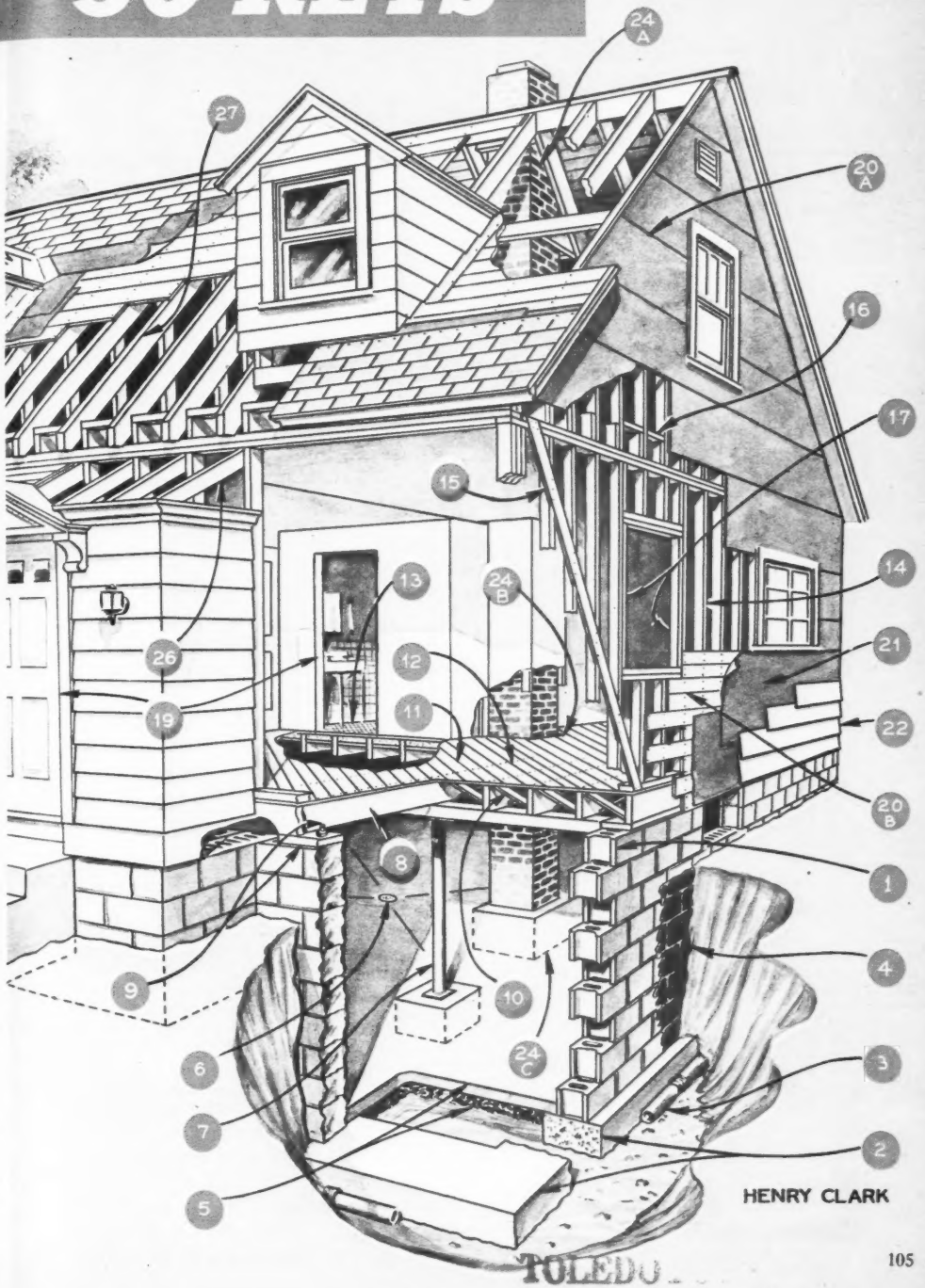
The one and only reason that shoddy workmanship is put into a house is the lack of appreciation of values on the part of the potential owner. When he purchases a suit, he considers its material and wearing qualities. In buying an automobile, he inquires about the engine, the brakes, the gas consumption, and so on. But when it comes to purchasing a home, all too often his good buying habits are forgotten in his anxiety to get a roof over his head.

Bear in mind that the total cost of a home involves not only the initial purchase price but also future maintenance expenses. In these times of [*Continued on page* 107]

KEYS

1. FOUNDATION
2. FOOTINGS
3. DRAIN TILE
4. MOISTURE SEAL
5. BASEMENT FLOOR
6. FLOOR DRAIN
7. SUPPORT COLUMN
8. FLOOR JOIST
9. SILL
10. BRIDGING
11. SUBFLOORING
12. NAILS TO JOISTS
13. TILE
14. STUDS
15. CORNER BRACING
16. FIRE STOPS
17. WINDOW AND DOOR FRAMING
18. WINDOWS
19. DOORS
20. SHEATHING
21. BUILDING PAPER
22. SIDING
23. VENEER WALLS
24. CHIMNEY
25. FIREPLACE
26. PORCH
27. RAFTERS

50 KEYS

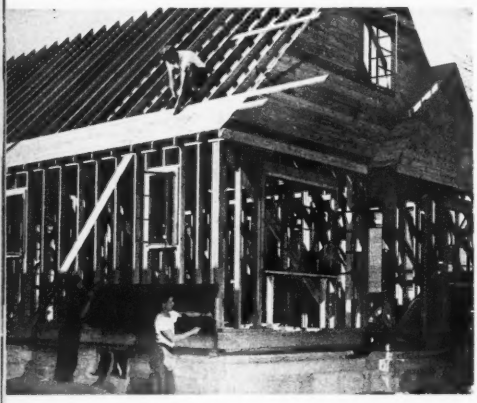


HENRY CLARK

TOLEDO
Technology Department

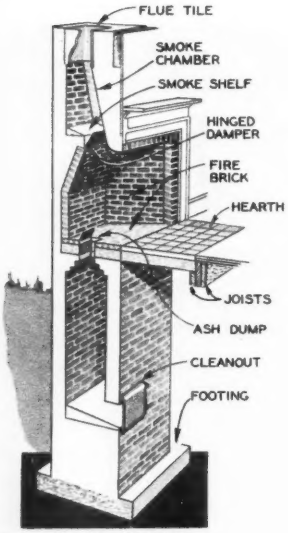
A waterproofing compound should be brushed over the exteriors of all concrete foundation walls.

Basement before concrete is poured. Note footings under the Lally-type support column and the wall.

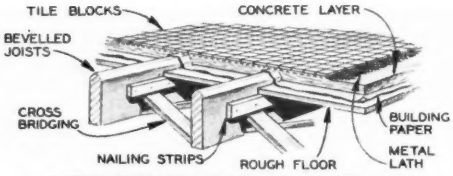


After completing the frame, the next step is to apply sheathing to the four walls and the roof.

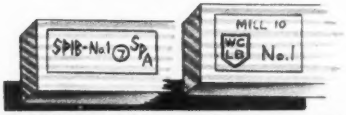
A completely sheathed house. Next comes a layer of building paper, then shingles or clapboards.



TYPICAL MASONRY FIREPLACE CONSTRUCTION



A WELL-SUPPORTED, DURABLE TILE FLOOR. WON'T SAG OR CRACK – ACCEPT NO LESS



SOUTHERN PINE ASSOC. GRADE-1

WEST COAST LUMBERMANS ASSOCIATION GRADE-1

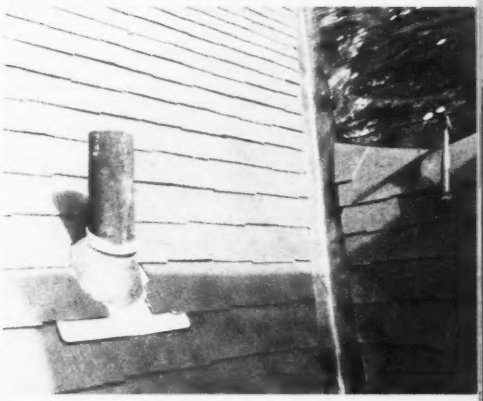
NORTHEASTERN LUMBER MFG. ASSOC. GRADE-1

WESTERN PINE ASSOC. GRADE-1

Here, men are laying the subflooring of a house. Note the floor joists, sill, and chimney footing.

When the joist span exceeds eight feet, bridging should be nailed in place to prevent twisting.

Plywood sheathing is often used instead of boards because it's easy to install and extremely strong.



To insure watertightness, valleys and flashings are installed before roofing shingles are laid.

high prices, many builders employ methods that cheapen the cost of construction, all too often cheating the homeowner by causing future repair bills.

Despite its apparent complexity, a house is not too difficult to understand—and an understanding of the fundamentals of house construction will pay off in the long run in the form of hard cash saved. Here are the 50 basic facts you should know to assure yourself of getting a well-built, trouble-free home.

1. *Foundation.* Concrete blocks, poured concrete, brick, or stone are normally used; all are satisfactory when properly installed. Concrete or masonry foundations must be at least 8 in. thick; stone or brick ones must be at least 12 in. thick.

2. *Footings.* The bottom of the foundation rests on these. Rectangular in shape, they are twice the thickness of the wall and at least 8 in. deep. They should be set on firm ground well below the frost line.

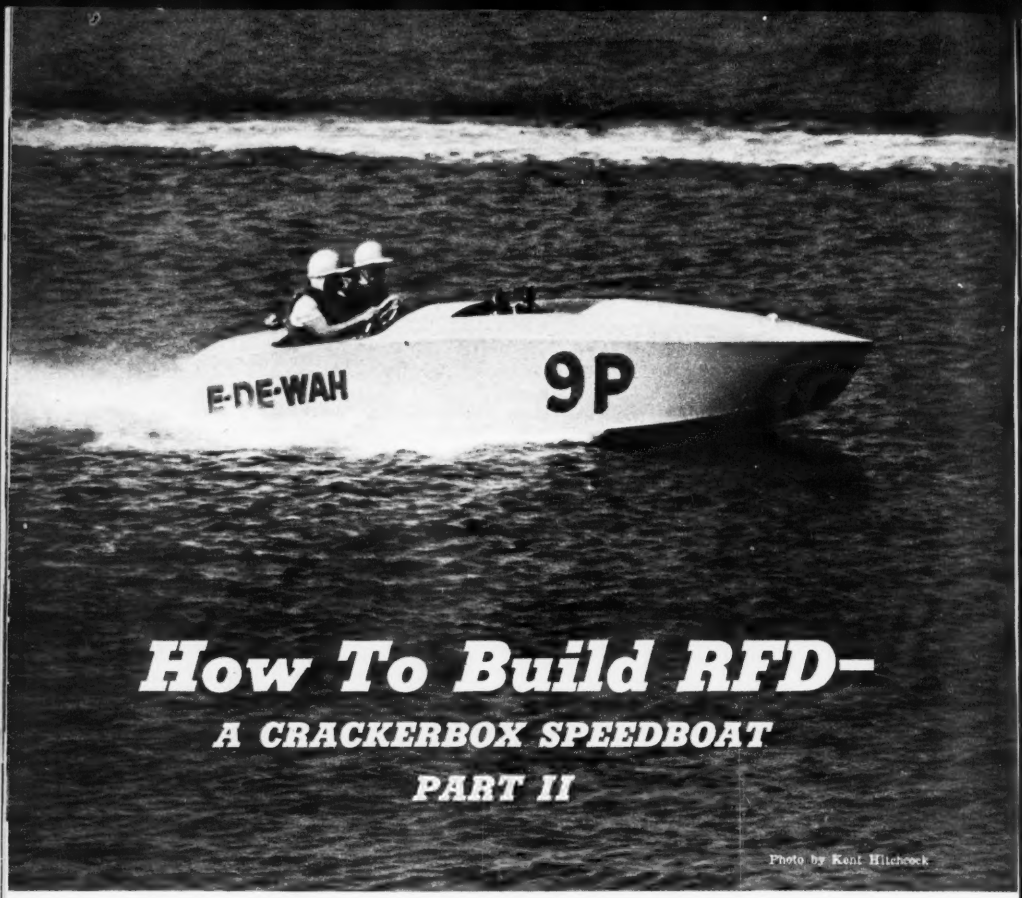
3. *Drain Tile.* Around the outside of the footings there should be a line of drain tiles connected to a dry well or sewer to drain off ground water.

4. *Moisture Seal.* A layer of hot asphalt over the outside of the foundation. [*Continued on page* 155]

Use the table below to make sure that the size and spacing of floor joists in your home are adequate and proper.

SAFE SPAN FOR FLOOR JOISTS

SIZE	SPACING	"AVERAGE" 40-lb. LOAD PER SQ. FOOT	
		PLASTER CEILINGS	NO PLASTER
2 X 4	12"		
	16"		
	24"		
2 X 6	12"	10'-8"	12'-0"
	16"	9'-8"	10'-6"
	24"	8'-6"	8'-7"
2 X 8	12"	14'-1"	15'-10"
	16"	12'-11"	13'-10"
	24"	11'-4"	11'-5"
2 X 10	12"	17'-9"	19'-11"
	16"	16'-3"	17'-5"
	24"	14'-3"	14'-5"
3 X 8	12"	16'-4"	19'-9"
	16"	14'-11"	17'-4"
	24"	13'-2"	14'-4"
3 X 10	12"	20'-6"	24'-8"
	16"	18'-10"	21'-9"
	24"	16'-7"	18'-1"



How To Build RFD—

A CRACKERBOX SPEEDBOAT

PART II

Photo by Kent Hitchcock

By David D. Beach, Jr., Naval Architect

As we warned at the close of last month's installment, the first thing you'll have to do this month is sand; so check your sandpaper supply and, after all projecting screw heads are filed smooth, go to work on the bottom and sides. Don't try to skimp on this job—the beauty and racing ability of your boat depend to a good extent on the finish you give it.

Carefully brush off all sandpaper dust; then apply a coat of a good filler, following the manufacturer's directions and allowing ample time for penetration and drying. When dry, sand lightly; then brush or spray on a coat of sealer. Allow about 24 hours to dry; then work a surfacing putty such as *Wood Dough* into all screw-head depressions and dents. Again sand smooth.

The prime coat of paint, which comes next, is usually pretty thin. After it has dried a day or so, it is lightly sanded and the second, somewhat thicker, coat is applied. This second coat should be wet-sanded to a smoothness that causes flies to skid when they land. When you see that happen, you can feel that you're approaching perfection.

About now, the shaft hole can be bored. A suitable jig is prepared to hold the long extension bit at the proper angle and the shaft hole is bored through the planking, keel, and Frame 10. After the hole is bored, a wire is run through at the shaft center line to aid in aligning the strut and shaft log. The shaft strut is secured through the keel with four ⅜-inch strut bolts. The strut bolts should be double nutted and burred slightly so no vibration can cause looseness.

The final coat of exterior paint is brushed on now. Give it ample time to dry—a couple of days, at least. Perhaps it should be mentioned that, if you plan to keep the boat in the water, a hard antifouling racing

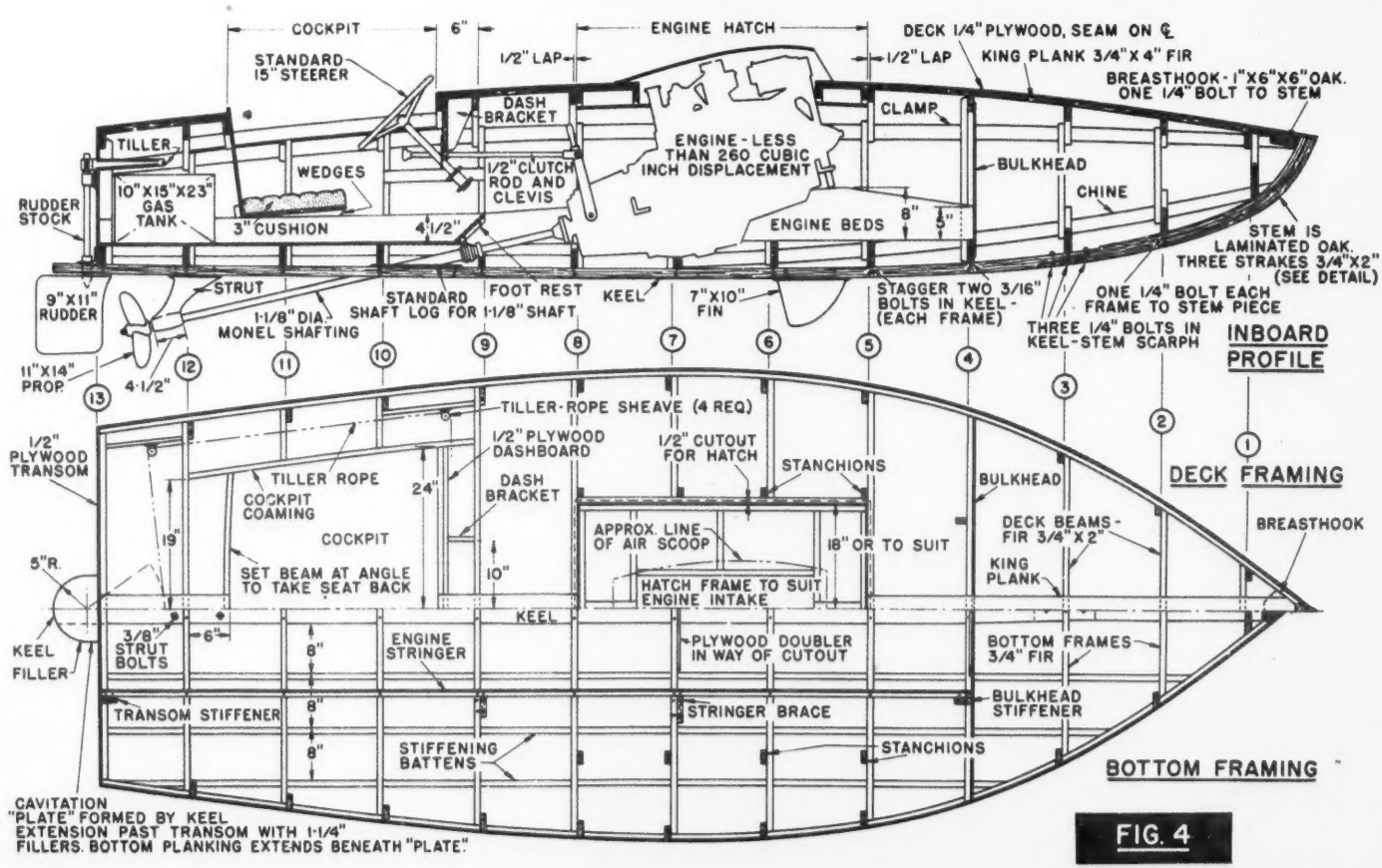

COCKPIT
6"
ENGINE HATCH
DECK 1/4" PLYWOOD, SEAM ON ℄
STANDARD 15" STEERER
1/2" LAP
1/2" LAP
KING PLANK 3/4" X 4" FIR
BREASTHOOK - 1" X 6" X 6" OAK. ONE 1/4" BOLT TO STEM
DASH BRACKET
CLAMP
TILLER
ENGINE - LESS THAN 260 CUBIC INCH DISPLACEMENT
WEDGES
1/2" CLUTCH ROD AND CLEVIS
BULKHEAD
CHINE
RUDDER STOCK
10" X 15" X 23" GAS TANK
3" CUSHION
4 1/2"
ENGINE BEDS
8"
1/2"
STEM IS LAMINATED OAK. THREE STRAKES 3/4" X 2" (SEE DETAIL)
9" X 11" RUDDER
STRUT
STANDARD SHAFT LOG FOR 1-1/8" SHAFT
FOOT REST
KEEL
7" X 10" FIN
STAGGER TWO 3/16" BOLTS IN KEEL - (EACH FRAME)
ONE 1/4" BOLT EACH FRAME TO STEM PIECE
1-1/8" DIA. MONEL SHAFTING
THREE 1/4" BOLTS IN KEEL-STEM SCARPH
INBOARD PROFILE
11" X 14" PROP.
4-1/2"
13
12
11
10
9
8
7
6
5
4
3
2
1
TILLER-ROPE SHEAVE (4 REQ)
1/2" PLYWOOD TRANSOM
1/2" PLYWOOD DASHBOARD
1/2" CUTOUT FOR HATCH
STANCHIONS
TILLER ROPE
24"
DASH BRACKET
BULKHEAD
DECK FRAMING
COCKPIT COAMING
COCKPIT
APPROX. LINE OF AIR SCOOP
18" OR TO SUIT
DECK BEAMS - FIR 3/4" X 2"
BREASTHOOK
19"
5"R.
SET BEAM AT ANGLE TO TAKE SEAT BACK
10"
HATCH FRAME TO SUIT ENGINE INTAKE
KING PLANK
KEEL
3/8" STRUT BOLTS
6"
8"
ENGINE STRINGER
PLYWOOD DOUBLER IN WAY OF CUTOUT
BOTTOM FRAMES 3/4" FIR
KEEL FILLER
TRANSOM STIFFENER
8"
STRINGER BRACE
BULKHEAD STIFFENER
8"
STIFFENING BATTENS
STANCHIONS
BOTTOM FRAMING
CAVITATION "PLATE" FORMED BY KEEL EXTENSION PAST TRANSOM WITH 1-1/4" FILLERS. BOTTOM PLANKING EXTENDS BENEATH "PLATE."

FIG. 4

LARGE-SCALE PLANS
will greatly simplify construction. Send $4 to MECHANIX ILLUSTRATED Plans Service, Fawcett Building, Greenwich, Connecticut. Please specify Plan No. B-162.

paint is best. However, if you're going to place your boat on a trailer between races, a good enamel or lacquer is proper. The color scheme is up to you. To help your fans keep track of your position in the fleet (before you break out in front of the pack), choose a distinctive motif. Red, yellow, white, rich blue, and other dramatic colors are suggested. Since there is no specific color scheme required in the Class Rules, here's your opportunity to let your decorative ability come forward.

A suitable cradle is now built to hold the boat when it is turned right side up. There should be a couple of 2x6-in. pine longitudinal members and two or three fitted forms in which the hull can rest. These can be cut from 2x6's also and should be adequately padded. Bolt the whole structure together and build it up enough to let you get underneath.

After the boat is turned over and resting in the cradle, you are ready to start on the decking, seats, engine installation, and other miscellaneous jobs that remain. A good job to tackle next is the shaft-log installation. Note on the Inboard Profile (Fig. 4) that the shaft log lands on the keel between Frames 9 and 10. It is aligned with the strut and bolted down on a white-lead or glue-soaked canvas gasket. The easiest way to align a log is to put the shaft in the strut bearing and through the log. Then move the log around until the shaft can be spun freely with but two fingers. That is the proper place for the log and it should then be well bolted to the keel.

The deck beams are sawn from rather wide planks. To avoid waste, they should be templated and laid out before sawing. They are secured to the tops of the side frames with glue and $\frac{3}{16}$-in. bolts or No. 10 wood screws. The beams in way of the hatch are supported by stanchions that land on the bottom frames. They provide the necessary strength to permit you to sit on the deck outboard of the engine hatch while working on [*Continued on page* 136]

BILL OF MATERIALS

(Approximate Quantities Required)

Waterproof Mahogany or Fir Plywood

Engine Stringers, Side Planking, and Decking: 4 sheets, 1/4" x 4'-0" x 16'-0" (five ply)
Bottom Planking, Seat Back, and Bulkhead: 1 sheet, 3/8" x 4'-0" x 16'-0"; 1 sheet, 3/8" x 4'-0" x 8'-0" (five ply)
Transom, Dashboard, and Seat Bottom: 1 sheet, 1/2" x 4'-0" x 8'-0"
Frame 1: 1 piece, 3/4" x 15" x 15"

White Oak

(Specify that wood is to be used for boatbuilding; is to consist of first, second, and select grades only; and is to be air dried to a maximum of 15% moisture content.)

Bottom Battens: 6 pcs., 1/2" x 1 1/4" x 18'-0"
Bulkhead: 1 pc., 1/2" x 1 1/2" x 6'-0"
Stem: 3 pcs., 3/4" x 2" x 5'-0"
Stem Covering Piece: 1 pc., 1" x 1" x 6'-0"
Chines and Clamps: 4 pcs., 1" x 2 1/4" x 18'-0"
Keel: 1 pc., 1 1/4" x 4" x 13'-0"

Spruce

(Specify that wood is to be used for boatbuilding, is to consist of A and B grades only, and is to be air dried to a maximum of 15% moisture content.)

Engine Stringers: 2 pcs., 1 1/4" x 8" x 13'-0"

Fir

(Specify as described for spruce.)

Floor Boards: 6 pcs., 1/2" x 3 1/2" x 3'-0"; 6 pcs., 1/2" x 3 1/2" x 5'-0"
Frames, Bulkhead, Transom, Stringer Braces, Deck Beams, Stanchions, Coaming, Hatch Headers and Framing, King Plank, Dash Brackets, Cockpit Beams, Brackets for Tiller-Rope Sheaves, and Seat Framing: 140 sq. ft., S2S 3/4", random widths and lengths

Fastenings

12 brass 3/16" x 1 1/4" roundhead stove bolts with nuts and washers
100 brass 3/16" x 2" roundhead stove bolts with nuts and washers
12 brass 3/16" x 3" roundhead stove bolts with nuts and washers
24 brass 3/16" x 4" roundhead stove bolts with nuts and washers
12 brass 1/4" x 3" roundhead stove bolts with nuts and washers
3 bronze 1/4" x 2" carriage bolts with nuts and washers
3 bronze 1/4" x 6" carriage bolts with nuts and washers
16 bronze 5/16" x 14" carriage bolts with nuts and washers
5 dozen brass 3/4" No. 6 flathead wood screws
4 gross brass 3/4" No. 8 flathead wood screws
10 gross brass 1" No. 8 flathead wood screws
4 dozen brass 1 1/4" No. 8 flathead wood screws
1 gross brass 2" No. 8 flathead wood screws
8 dozen brass 1 1/2" No. 10 flathead wood screws
8 dozen brass 2" No. 10 flathead wood screws
2 brass 3" No. 14 flathead wood screws
12 bronze 1/2" x 8" lag screws

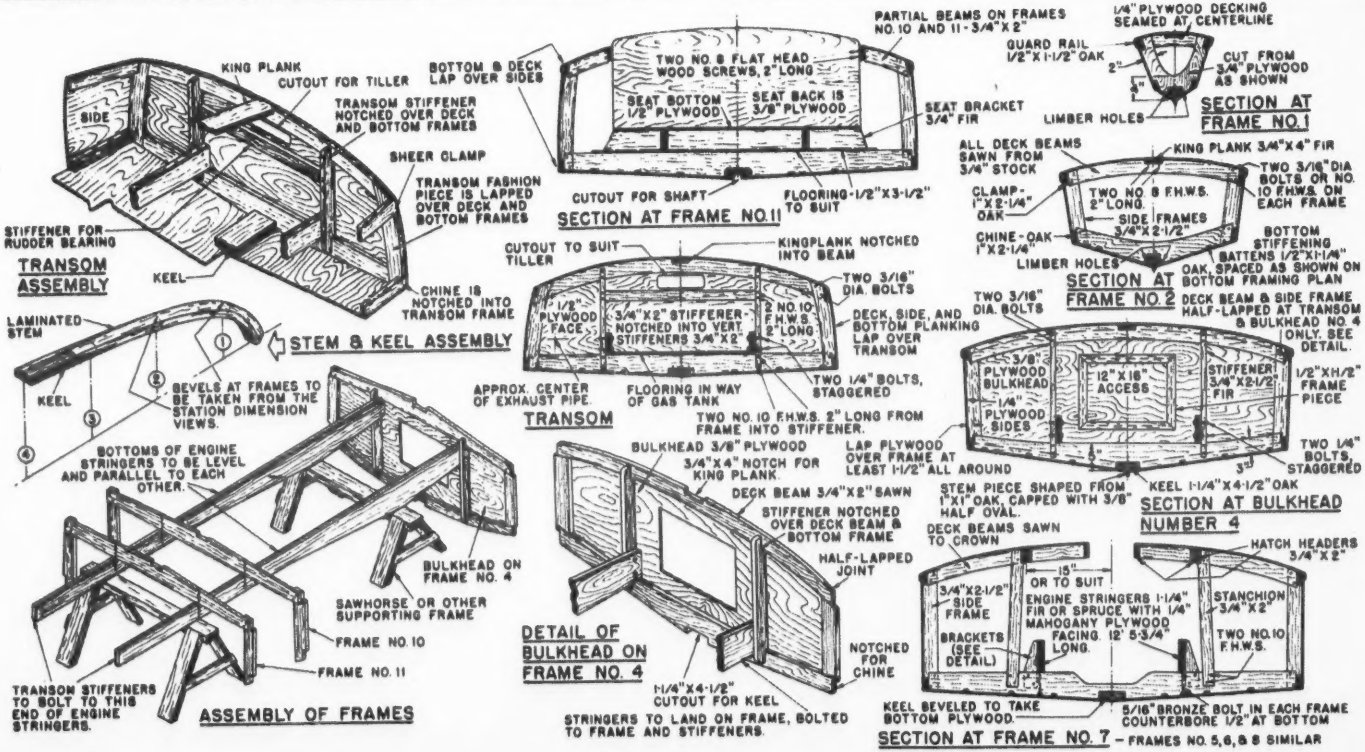
Miscellaneous

1 pc. brass 3/8" half oval
2 lbs. crack filler
1 gal. marine glue
1 gal. filler
1 gal. primer
3 gal. marine paint, color to suit
3 gal. spar varnish

Notes

1. Complete kits of hardware can be purchased from John Dory, P.O. Box 96, Fair Haven, New Jersey.
2. Kits for converting automobile engines for marine use are manufactured by Osco Motors Corp., Philadelphia 34, Penna., and the Lehman Mfg. Co., Newark 2, New Jersey.

FIG. 5—CONSTRUCTION DETAILS



Water is the landscaper's delight—dam up that little spring or stream.

the abc's of landscaping

Make those dreams about fixing up your homestead come true.

NO one can tell you exactly how to improve your land. You have to figure it out for yourself because first of all your taste probably differs from ours and second, since you can't move scenery around as if on stage, the terrain must be taken as is. What we shall undertake here is merely a bit of garden-walk superintending.

No doubt you have in mind some fairly vague plan for fixing up your place. The first thing to do is to get your ideas down on paper. Let the rest of the family contribute their two-cents' worth; then work out a general over-all picture. Once you get something to your taste, stick to the basic features of the outline even if you vary the details later.

Your plan will naturally take into consideration the nature of your land. If you have a city lot or a flatly graded suburban plot, you must obtain the desired effect by *construction* and on a small scale rather than by taking advantage of space and naturally varied terrain. It is neither feasible nor necessary to regrade a restricted area; in fact, this might create a troublesome drainage problem. Instead, leave the topography alone and give the impression of varying contours by differing the heights of your trees and shrubbery. Break up flat, uninteresting expanses with hedges, low walls, or natural plantings.

On the other hand, if your property has some unusual natural features— a wooded area, a brook, a hillside slope, or any irregularities of grade—make the most of them, accentuating their attractiveness and leading the eye to them.

One of the secrets of landscaping is to know where to begin. Give your first attention to the boundaries and corners of your property. This rule applies not only to the property as a whole, but also to subdivisions such as gardens, service areas, lawn spaces, and recreational grounds. You will find that you make fewer mistakes, especially if you are the type of person who improvises as he goes along.

To exclude unsightly surroundings and secure protection and seclusion, fence the land, hedge certain sections, or plant screens or windbreaks. It is easy enough to know what to hide, but it is harder to remember to leave a distant view for enjoyment. The things you put in the ground today will eventually grow up and pen

you in. Remember that you want light as well as shade, the stir of a vagrant breeze as well as shelter from boisterous gales—you want a little bit of all of nature's resources and not too much of any one of them.

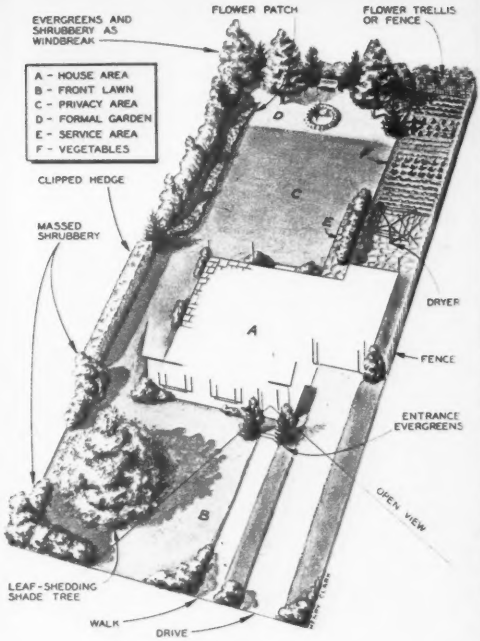
If you're starting from scratch, choose a homesite on a sunny southern slope with a natural windbreak to the north and face the house southeast with its corners in line with the cardinal points of the compass. There is no better way to insure happy indoor and outdoor living all the year around. If you already have your home, you can secure some of these advantages by opening up the southern exposure and planting dense (preferably evergreen) windbreaks to the north.

The best procedure to follow when you start cutting up the area within a lotline is to allot a specific use to each subdivision. Consider including a formal garden, a vegetable garden, a service area (usually around kitchen door), and a playground. Paths and driveways should be practical, convenient, and usable.

This raises the question of unity of effect. If you start out with a rustic dell in mind and begin throwing in formal details patterned after the Gardens of Versailles, you ain't gonna have no unity. Don't try to cram everything you have ever seen and liked into your scheme.

Anyone who has ever dipped into a garden encyclopedia has read of foundation plantings. These masses of high and low evergreens are planted smack up against the house to hide the ugly foundation. Make sure that you plant true shrubs, not trees in their immature state. The latter will grow right into your second-story windows in a few years and make your house as dank and dark as the fifth level of a coal mine.

Many of today's houses have low foundations, lessening the need for concealment. Trellised roses, vines, espaliers, or flowers can be substituted in such cases for massed evergreens. If you require shade near the house, plant deciduous (leaf-shedding) trees. They will give shade during the summer months, but will allow sunlight to enter in the winter. As a rule, do not plant trees directly in front of the long side of a house. This breaks up the architectural lines. It is much better to plant them at the corners, where they serve as frames. •



An open lawn interspersed with nice shade trees carries the eye naturally on to distant vistas.

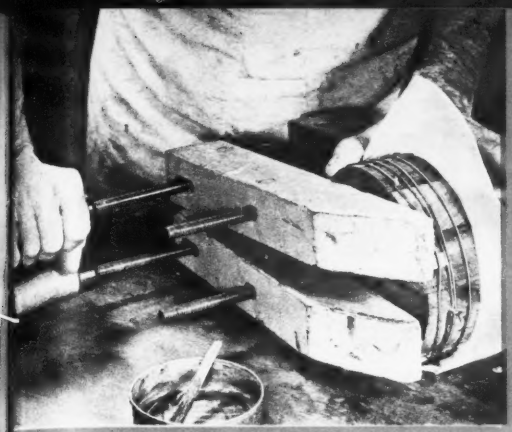
Evergreens provide wind shelter, insure privacy, and screen bad views when placed along lot line.

"If the little lady's a workshop widow," says MI Guy, "here is the perfect peace offering."

turned table lamp

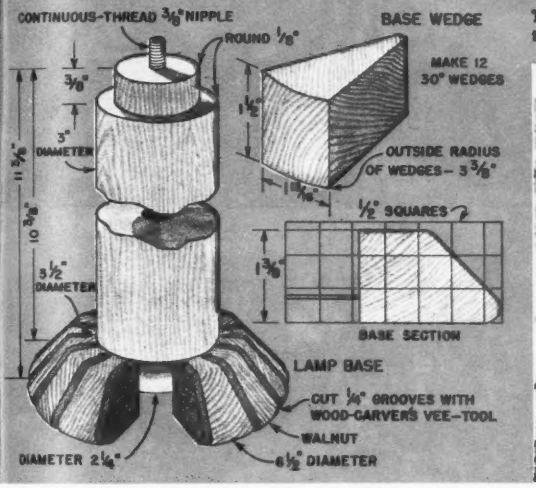
DESIGNED to take one of the popular conical shades with ruching trim, this lamp in maple and walnut is a lathe project that will grace any room. Turn the column from 3x3-in. maple, working a tenon on the lower end and an ornamental shoulder at the upper end. Bore a ⅜-in. hole in the top, to receive a continuous-thread nipple, and meet it with a larger hole bored from the other end of the column.

Build up the base from 12 wedges bandsawed from 2x2-in. walnut. True them with a sanding disk, checking by dry-assembling on a circle drawn on a board. When ready, coat all joining faces with casein glue, assemble immediately, and draw together with a column clamp or three or four pieces of baling wire. Test for alignment by laying



Gluing face disk to base. After turning, insert chisel between base and disk to split the paper.

With the base attached to the lathe, cut grooves in the base with a common woodcarver's V-chisel.



Turn the mortise in the base to fit snugly over the previously turned tenon on the 3-in. column.

a straightedge across the top. Clean off squeezed-out glue and plane the poorer side flat. Bandsaw a wooden disk, coat it and the base with glue, and clamp together with a sheet of paper between. This gives a mounting for screwing the base to the lathe's faceplate.

Turn a mortise to fit the column tenon snugly. While the base can be left plain, it harmonizes better with the shade ruching if grooves are cut at the joints. A woodcarver's V-tool is useful for this job, but you could use an ordinary chisel. Clean up the carving with a square file and sandpaper.

Finishing is simplified if the base and column are done separately. You can glue the column tenon into the base as a last act before wiring the lamp.

Install a two-socket fixture. Wire it and thread the cord down through the column hole and along a groove cut in the bottom of the base. Hold it in this groove with a few brads, being careful when bending the brads over not to cut the insulation on the wire. Glue a circle of felt to the underside of the base to protect any polished surface on which it might stand.

Slipshod finishing can ruin the appearance of any well-made project. If you forget to sand between shellac and varnish coats, for example, the varnish won't dry properly, giving a pebbly effect. Or if you overlook applying filler, the surface will always look rough and pitted. Always remember that if a project is worth making at all, it is worth finishing carefully and properly. This adage applies equally to so-called natural finishes and painted, lacquered, or enameled jobs. •

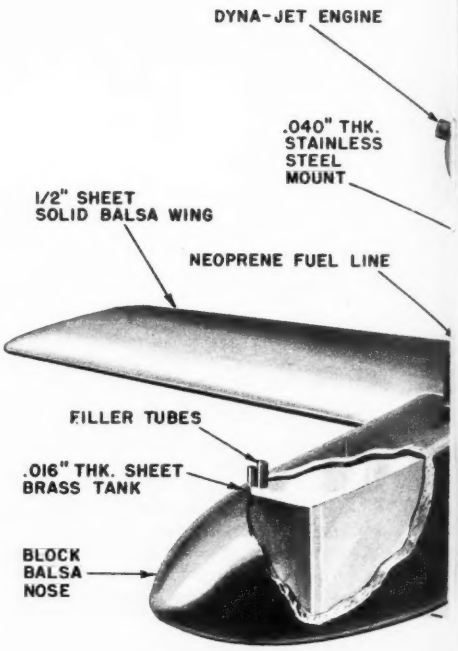
MI METEOR

Looking for a jet propelled model? Then build this 36-in. trainer which has attained speeds in excess of 130 mph!

By Jerry Lemelson

AFTER two years of experimenting with jet models, a fast, simple and economical to build design has been completed—the MI Meteor. The design follows the pattern set by the notorious German V-1 "Buzzbomb," in that the propelling unit is mounted above the plane. This location is necessary because the extremely high operating temperature of the jet engine would burn the plane if it were enclosed in the balsa fuselage, unless elaborate precautions were taken to insulate the engine or use an all metal plane.

The jet engine used is of the resonant jet type commonly called "reso-jet" or "pulse-jet." The original power plant was a Dyna-Jet, which can be purchased at all hobby shops. Power is derived from the high frequency explosions in the combustion chamber. These explosions are so rapid (over 200 per second) that the resultant effect emerging from the tail-

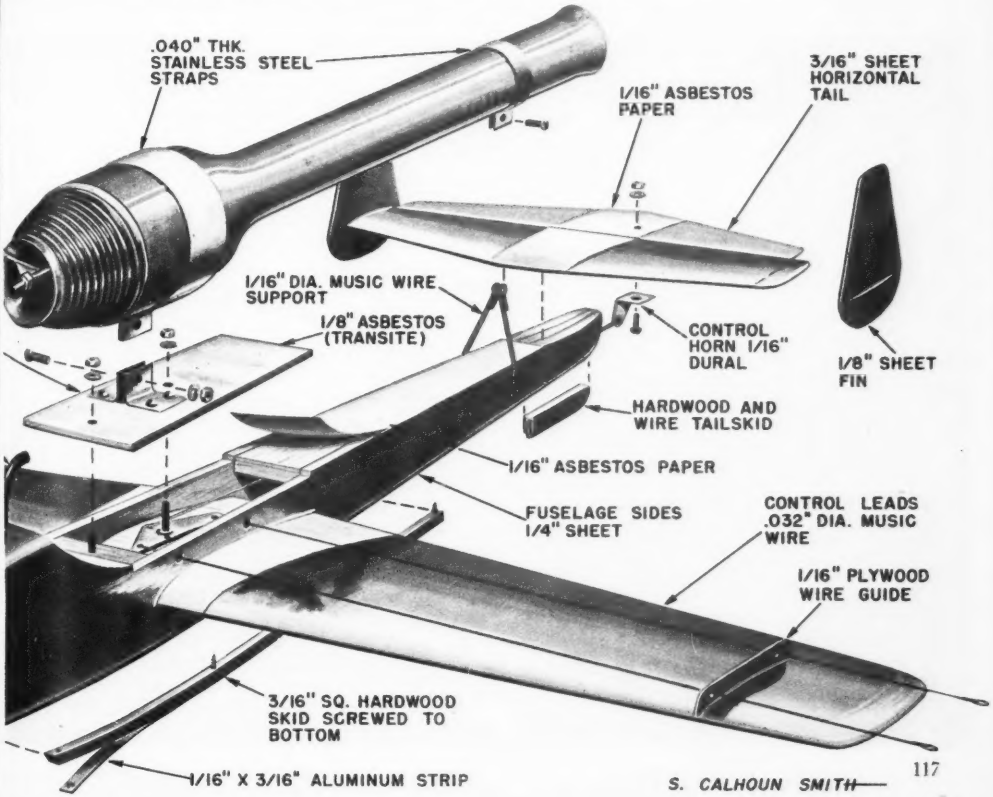


pipe is that of a steady blast of hot gas.

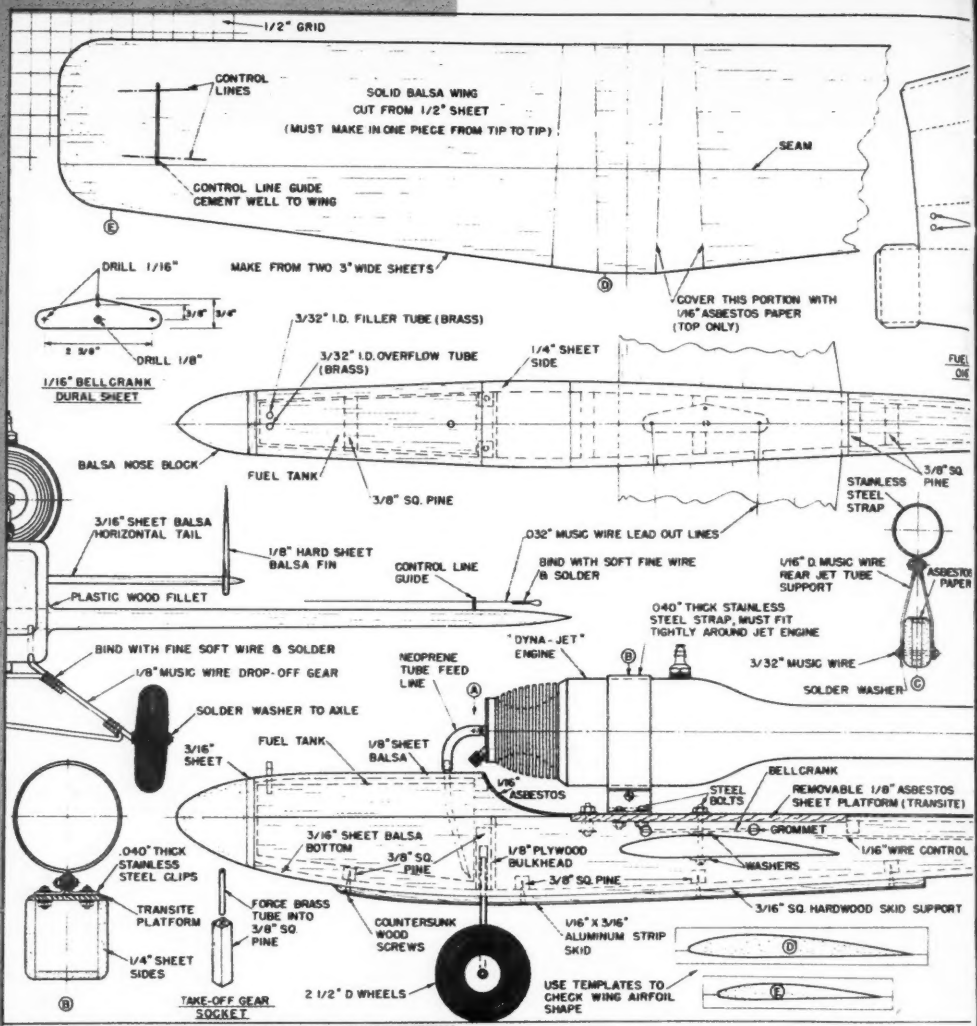
Instead of using a hollow balsa block for the fuselage, which is common practice on speed models, hard sheet balsa was used. The ¼-in. sheet balsa sides are cut first. Be sure to cut the slot for the wing at this time. Cement the ¼-in. sheet spacer well in the tail between the fuselage sides and pin and clamp in place until dry. Now insert the ⅜-in. square balsa and pine cross braces, using plenty of cement. The upper nose section is now added. This also has ¼-in. sheet sides with ⅜-in. cross braces. Cement the $\frac{3}{16}$-in. sheet to the nose followed by the nose block which is carved roughly to shape. The drop-off gear socket is now made from two ⅜-in. square pine strips. These are drilled through and brass tubing is forced into each strip. This tubing should be of a size that will allow the drop-off gear wire to slide freely without binding and yet not wobble. Cement these sockets to the plywood bulkhead and, when dry, cement the bulkhead in place. This can be filleted with Plastic Wood.

Trace the fuel tank pattern on thin brass sheet and cut out and solder the seams well. When the tubing connections are also soldered, plug two openings and attach the neoprene tube to the remaining connection. Then submerge the tank in a pot of water and blow through the neoprene tube. Any leaks will be easily detected through the presence of air bubbles. Install the tank at this time.

The wing is cut from solid balsa and is easy to construct. What is more important is the fact that it is also easy to repair. Glue the two pieces of ½-in. sheet balsa together, using large clamps or other pressure to obtain a good joint. When dry, trace the wing plan and cut to shape with a coping saw. Now cut out the two templates on the plan and cement to stiff cardboard. Use these to check the airfoil as you carve the wing to shape. A sharp knife, razor, plane and coarse sandpaper should be the only tools required for this job. Finish off the wing with fine sandpaper and clear dope once. Now you should have a wing with the N.A.C.A. 2409 speed airfoil. Slide the wing into the slot previously cut in the fuselage and, when in position, apply large quantities of cement inside as well as outside of the fuselage at the wing joint.



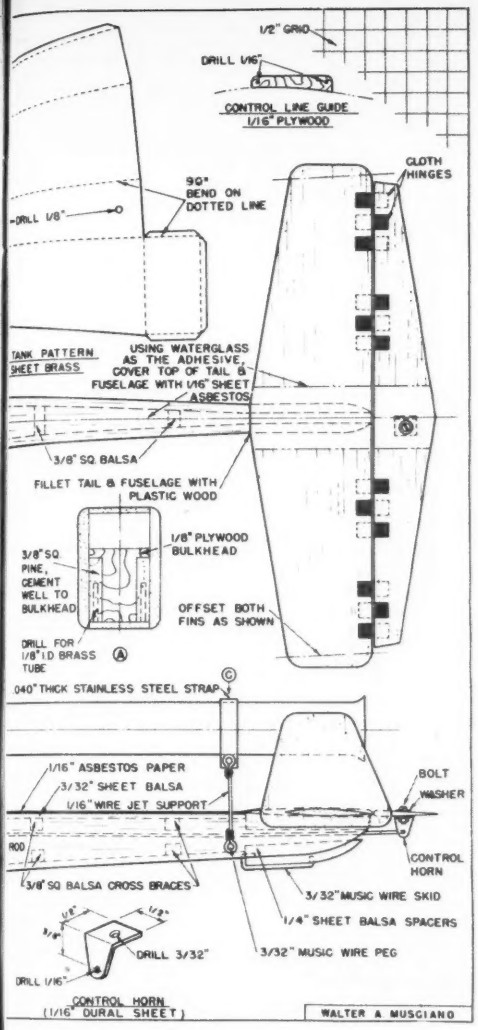
S. CALHOUN SMITH—



FULL SIZE PLANS

of this model are available by sending 50 cents to: MECHANIX ILLUSTRATED Plans Service, Fawcett Building, Greenwich, Connecticut. Please specify Plan No. 402.

Cut the tail surfaces from the specified stock and sand to a streamline cross section. Hinge the elevator to the stabilizer and then cement the stabilizer in place on the fuselage. Either cut the bellcrank from the specified stock or purchase a similar one from your hobby shop. Cut the "Transite" (asbestos sheet) platform to shape and drill holes both for the bellcrank pivot bolt and the bolts which retain the stainless steel jet engine mount clips. Attach these clips securely, using 6-32x¾-in. steel bolts. Drill the mounting holes through the Transite and pine cross brace and bolt the platform in place. Install the control sys-



tem and then cover the fuselage top with sheet balsa as shown.

Mark off the location; on the fuselage side, of the cross braces on the bottom, then cover the fuselage bottom. Now we have the cross brace locations in spite of the fact that the fuselage is covered. Drill small pilot holes along the center line for the landing skid retaining screws after the $\frac{3}{16}$-in. sq. hardwood skid is cemented in place and filleted with Plastic Wood. Add the aluminum skid and screw in place. The vertical fins are now cemented in place.

The entire plane should receive a thorough sandpapering, first with medium and then fine sandpaper. All wing and tail joints and the landing skid can now be carefully filleted. When smooth and dry, clear dope the entire ship and sand off the balsa nap. Cover the entire ship with light weight Silkspan paper using clear dope as the adhesive.

Fire resistant aluminum paint can be applied if desired. A good grade of engine enamel can also be used, the color can be left to the builder's taste. However, it is suggested that a light gray or bright yellow be used as these colors will tend to reflect any heat radiated from the jet engine. Do not paint the Transite platform. Two or three coats should produce a good finish. Wait at least 48 hours and then the finish can be rubbed with a good grade of rubbing compound for that fine finish which will add several mph to the speed. Now cover the specified areas with $\frac{1}{16}$-in. asbestos sheet, using water glass as the adhesive. Water glass can be purchased at most drugstores.

Bend the take-off gear from ⅛-in. dia. music wire and join well with fine wire and solder. Be sure the prongs fit into the brass tubes perfectly. Add the wheels and solder the retaining washers in place.

We can now attach the powerplant. Cut the stainless steel straps as indicated. It is suggested that cardboard patterns be first made and then the stainless steel can be cut to the pattern shape. Bolt the forward strap in place securely and then bend the $\frac{1}{16}$-in. wire and attach the rear end as the plans indicate. With an empty tank the model should balance ⅜-in. behind the point where the forward control line enters the fuselage. Any deviation from this point can be corrected to a limited extent by shifting the jet tube forward or aft.

Before flying, it is advisable to study the engine manufacturer's operating instructions because these engines are not toys and should be operated using every precaution and adult care. We cannot overemphasize the amount of heat generated by the jet engine. Never touch the jet when running or for several minutes after it has stopped. Keep away from the jet exhaust when running. Do not run the engine on the ground any longer than is absolutely necessary. When preparing the craft before the flight, the pilot should remain at the controls while at least three persons are used to start the engine. In this way the model will become airborne soon after the jet is started.

Stainless steel stranded line of .016-in. dia. should be used as flight lines. These can be from sixty-five to seventy-five feet long. •

car care

Photo by Robert Brightman

Is your car really streamlined? You can decide this point by driving over a dusty road. If the rear of the car becomes covered with dust you'll know that your design isn't scientific. In a correctly streamlined body the vortex should be about 200 ft. behind the car. That would leave the rear of the car dust free.

Erratic ignition may result from looseness of the bolt that holds the octane selector plate of the distributor.

Sticking brake shoes can be detected by tapping the drum with a hammer. The drum won't ring unless it is free of shoe pressure all around.

Flexibly mounted engines tend to loosen hose connections. Check them when servicing the cooling system.

Better ignition can be had by installing a relay in the ignition circuit. The modern switch has entirely too much work to do handling radio, heater and other accessory circuits.

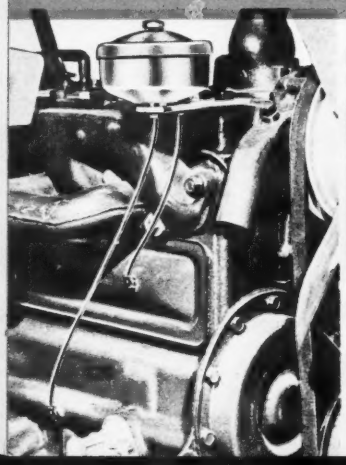
Loose fuse clips, or corroded connections, account for many a burned out headlight. Intermittent open circuits cause excessive voltage build-up.

Sealed beam headlights need clean contacts the same as any other lamp bulb. Remember this when installing the lamp.

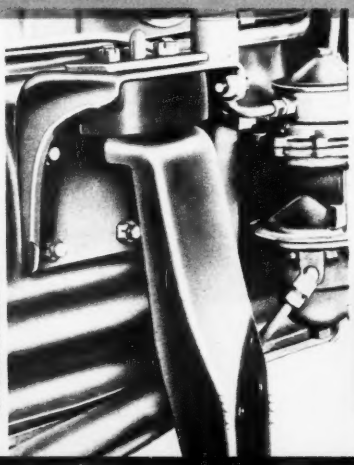
Spark plug protectors do more than keep moisture from settling on the porcelain. They prevent high tension wires from coming loose.

Get a push, rather than a tow, if your car has an automatic transmission.

Newest filter does not require changing; merely soak in gasoline to renew. Porous metal does the job. Called Filterail.



Front end noises that defy diagnosis may be due to a loose motor mount. It is most apparent when warming up.



A squirt of oil along the fender welt will not only prevent squeaks, but will also prevent entrance of water and rusting.

BEHIND THE WHEEL

With Fred Russell

If you want a personal reply, please enclose a self-addressed, stamped envelope.

My 1936 Chevrolet has so much scale in the head and block, water will not even come out of the drain plug. Evert L. Jones, Nevada, Mo.

Flushing compounds won't do you any good. You'll have to take off the head and remove the core plugs in order to take out the scale manually.

●

What can I do to my 1946 De Soto to make it theft proof so that a "jumper" cannot be used around the ignition switch? R. E. Constance, St. Louis, Mo.

Write to the Electro-Cop Company at 1158 Parsons St., Pittsburgh, Pa. They make a special switch which foils the average car thief.

●

What causes my 1937 Buick to skip and miss when accelerating rapidly? When accelerating slowly, everything seems to be normal. Lavern Wallis, Plano, Ill.

Your car isn't getting enough gasoline. The carburetor's float level is too low or the fuel pump pressure isn't up to par.

●

I can only get about 10 to 12 mpg on my 1948 Packard. My average speed is between 60 and 70 mph. Tom Colley, Jr., Elberton, Ga.

That's about all you can expect at speeds above 60 mph. Try driving at 35 and see what a difference there is in gas mileage; you'll nearly double your mileage.

●

How can I prevent a fan belt from squeaking? I've tried wax, tightening, and loosening. Robert K. Brown, St. Petersburg, Fla.

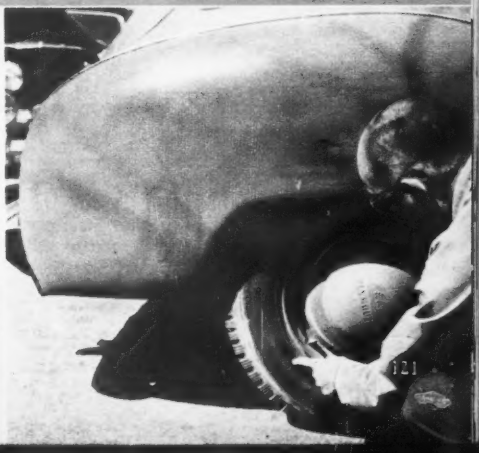
Try roughing up the edges with a screwdriver.

Rolling your own is a good way of checking for tight wheel bearings and dragging brakes. Inflate tires first.

A greased hood latch will make the hood go down and lock without the usual extra slam.

The pivot point of the windshield wiper is a place often neglected when car gets a greasing. Use light oil.

Sidewall cracks are a sure indication that the tires are being run with insufficient air.



Walter J. Howell, veteran FCC inspector, operating signal transmitter during test.

passport to everywhere

As holder of an amateur radio license, you can talk to "hams" all over the world. Here is information on how to get your license.

By Robert Hertzberg

THE amateur radio license issued by the Federal Communications Commission is a rather remarkable little document. It doesn't cost a cent. Once issued, it can be renewed indefinitely at five-year intervals. It entitles the holder to operate as much short-wave transmitting equipment as he likes on any or all of a dozen different frequency bands. He can have a fixed station at home and mobile units in his car, his boat, and his airplane. He can pack another mobile unit on his back if he feels so inclined. He can talk to fellow amateurs, or "hams," as they prefer to be called, all over the world. The hobby of ham radio has developed such terrific appeal over a period of many years that its devotees number over 80,000 in the [*Continued on page* 150]

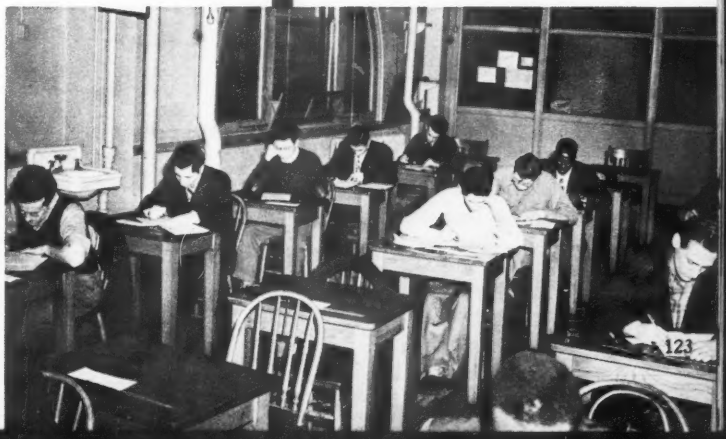
Applicant Irving Fisher, of West Hartford, Conn., starts his examination by filling out application.

Taking the code-receiving test, Mr. Fisher wishes he'd practiced more the day before.

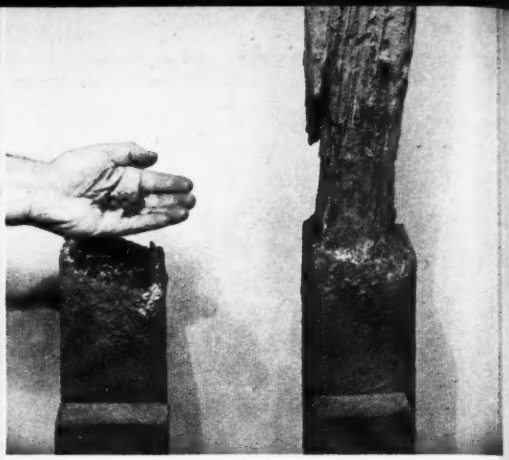
Fisher taps message to Examiner Chas. Finkleman, whose deadpan expression masks good impression.

The final step is the written examination, which Fisher completed in about 70 minutes.

The deep concentration of these applicants was not posed. The youths were so intent on their papers they were hardly aware that a photograph had been taken. This is the main examination room of the FCC office in New York City.



Summer-Chair storage problems during the winter are solved by hoisting them above the entrance of a one-car garage, as shown. The top of the door frame is one support and a length of iron pipe retrieved from a junkyard forms the other. The pipe is cut to fit snugly across the span and the chairs are "walked" into place with two rakes.

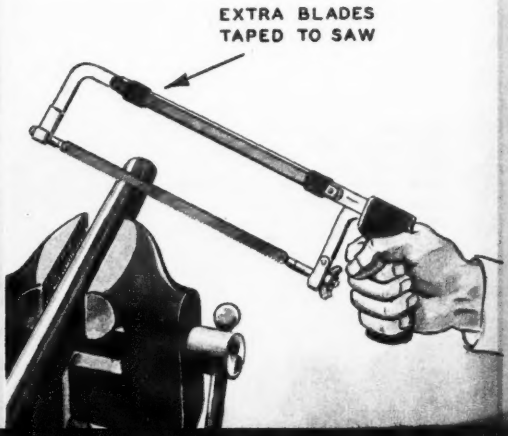


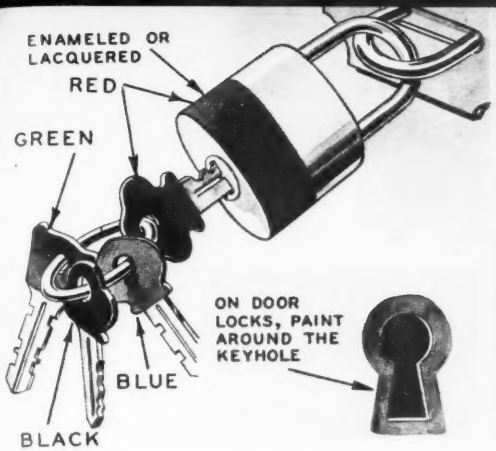
Creosote on Posts is a good rot preventative. This picture of the remains of two untreated gate posts at a country home graphically shows the importance of thorough treatment of wood that is to be buried. These 4x4-in. fir posts were sunk to a depth of about 3 ft. After four years, they looked as shown. Properly creosoted posts nearby show no rot and don't have any termites.

HOME and SHOP

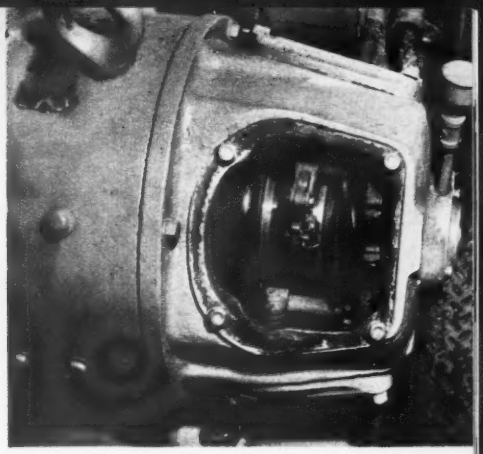
Surplus Gas Cans, which can be picked up for about a buck apiece, make excellent containers for such liquids as spare fuel for the family car, antifreeze, and water for drinking and cooking at summer cottages and bungalows that do not have reliable local sources. These cans are finished inside with clean enamel. Paint exteriors to suit.

Hacksaw Blades usually break, annoyingly enough, while the store is closed. So that you don't have to stop work, it's a good idea to keep some extra blades taped to the saw holder, where they will not interfere with the usefulness of the tool. New blades can be attached conveniently without loss of time. For further convenience, select blades with different degrees of bite.





Color on Locks and keys makes it easy to find the right key for the right lock. Using either enamel or lacquer, put a colored stripe around each padlock and treat the top of each key in the same manner. For a door lock, simply paint a colored spot around the keyhole. If there are some marks on a key you'll want to read later, paint but one side. Otherwise, just dip in paint.



Inspection Plate of plastic, in place of one of the regular inspection plates on a motor, permits constant observation of the armature and brush condition without the necessity of shutting down the motor and removing the plate. The plastic is 5/16 in. thick, cut out to match the shape of the old metal inspection plate, and installed over a gasket.

SHORTS

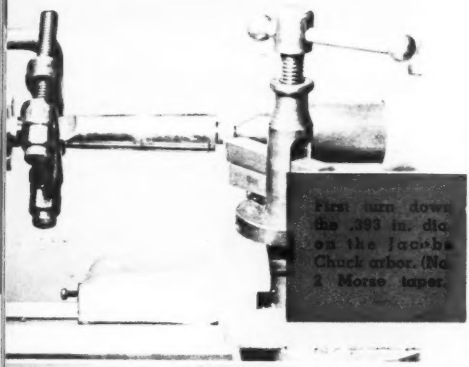
Clean Refrigerators are more efficient because they do not heat up as much as dirty ones. If you peer into the machinery of yours, with the aid of a flashlight, you'll probably be shocked at the way the insides are matted with a fluffy layer of dust. Take the back plate off, ease the unit out a little way, and go to work with a paint brush and a flat vacuum-cleaner nozzle.

LIVE CENTER
for your lathe

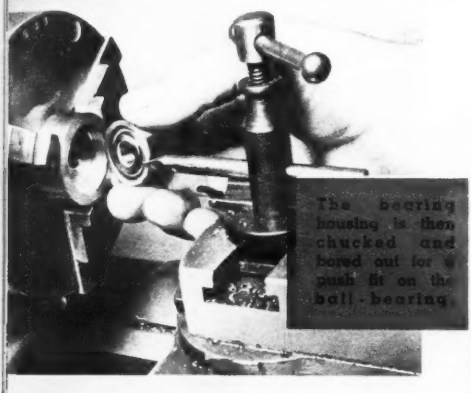
A dual purpose ball-bearing tailstock center that will be an asset to any shop.

By Frank Faber

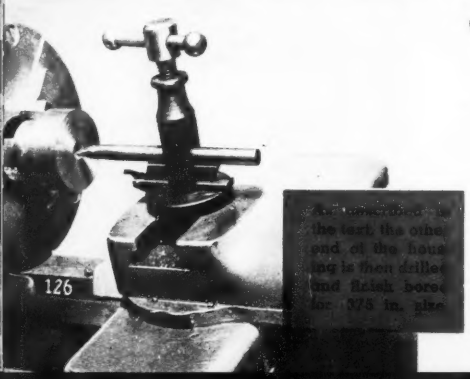
Tool Room Section Foreman, Sperry Gyroscope Company



First turn down the .393 in. dia. on the Jacobs Chuck arbor. (No. 2 Morse taper.



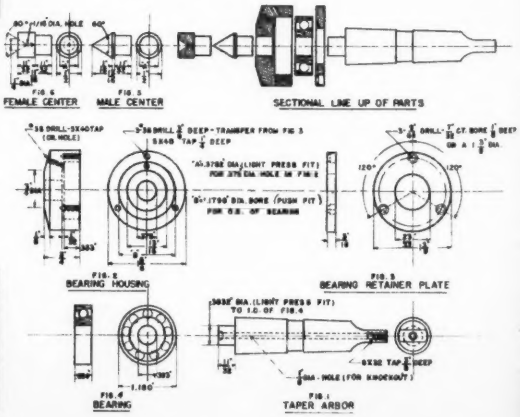
The bearing housing is then chucked and bored out for a push fit on the ball-bearing.

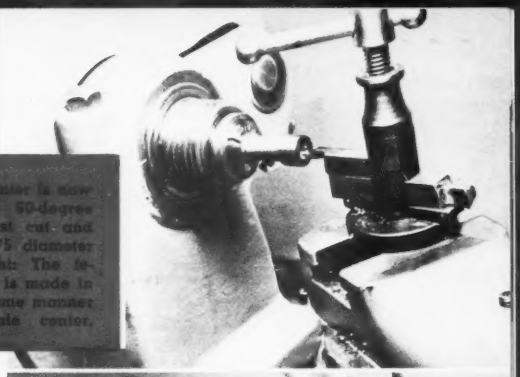


As mentioned in the text, the other end of the housing is then drilled and finish bored for .375 in. size.

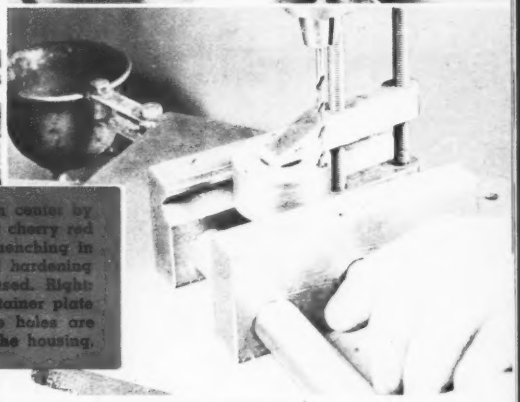
HERE is a live center that is different from the conventional ball-bearing center in that the male 60-degree unit can be removed and a 60-degree female center inserted in its place. This provides a means for turning shafts having male centers at their ends, a feature not found in the standard types of ball-bearing centers. Another important feature is the short overhang from the tip of the 60-degree center to the back of the bearing, which adds considerable rigidity to the tool. The 60-degree point will remain true and unmarred indefinitely, due to the fact that the radial and thrust loads of machining operations are taken by the bearing.

Home and professional machinists alike will find this accessory a most useful precision tool and a very interesting project to build. Start the project with the taper arbor, Fig. 1. A Jacobs Chuck Arbor, No. 2 Morse taper, for chucks No. 6A, 12, 34, 500, was used in the original project. These arbors have a finish ground taper and can be purchased at any machine tool supply store, at [*Continued on page* 144]

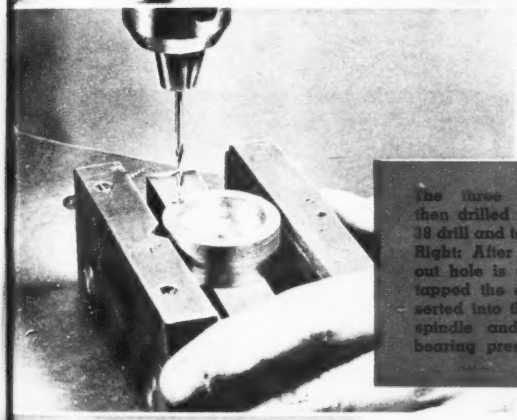


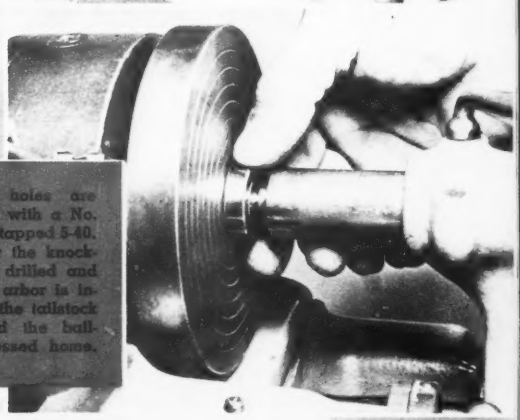


The male center is now turned. The 60-degree angle is first cut and then the .375 diameter turned. Right: The female center is made in much the same manner as the male center.

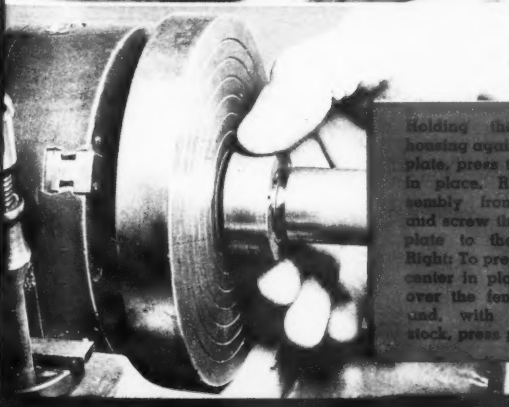


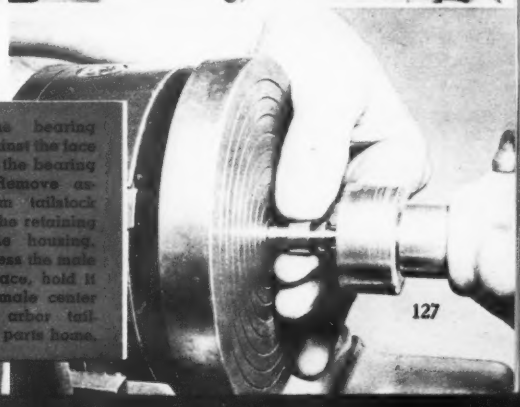
Harden each center by heating to a cherry red and then quenching in oil, if an oil hardening steel was used. Right: After the retainer plate is made the holes are spotted on the housing.



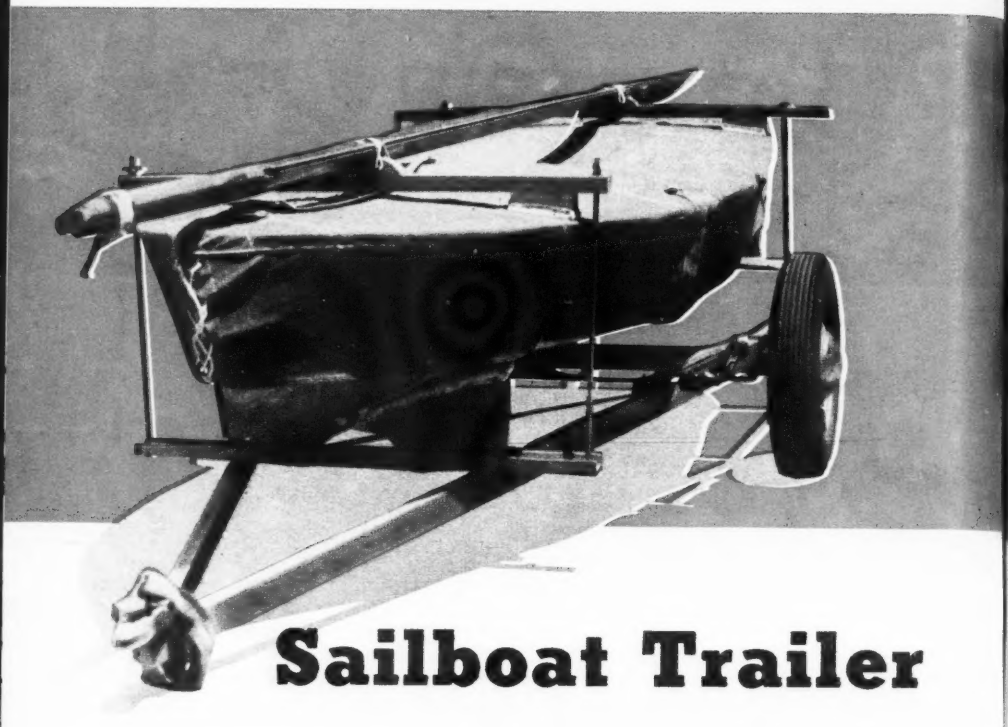


The three holes are then drilled with a No. 38 drill and tapped 5-40. Right: After the knock-out hole is drilled and tapped the arbor is inserted into the tailstock spindle and the ball-bearing pressed home.

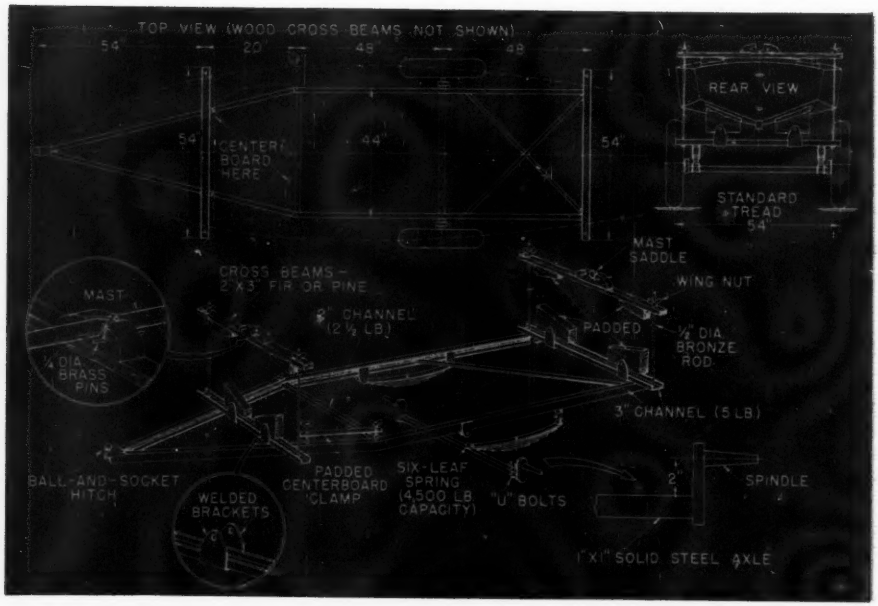


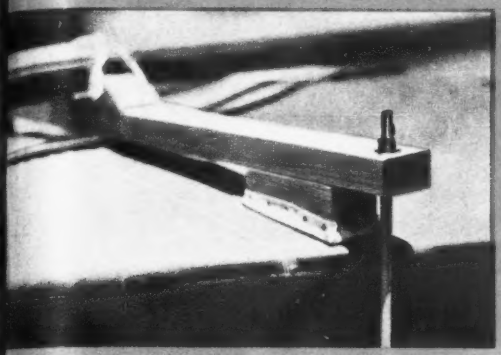


Holding the bearing housing against the face plate, press the bearing in place. Remove assembly from tailstock and screw the retaining plate to the housing. Right: To press the male center in place, hold it over the female center and, with arbor tailstock, press parts home.

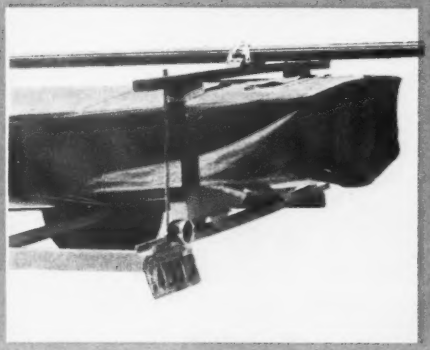


Sailboat Trailer





Beveled and padded blocks, screwed to undersides of the crossbeams, and wingnuts on bronze rods provide means for snugly holding boat in place.



Mounted atop the wooden crossbeams are saddles in which the mast lies. It is tied with light lashing over pins driven through the saddles.

By Hi Sibley

HERE'S a well-balanced trailer that'll take any centerboard sailboat up to about 18 ft. long. It will tow well behind your car and will hold your boat so snugly that there can be no injurious chafing or strain. There are special clamps on the trailer chassis to take the centerboard. This method of taking care of the centerboard is, of course, much better than the usual one in which the board is merely laid in the boat's cockpit where it can bang and bump about in a lethal manner. And the mast is also securely accommodated, wooden saddles for the purpose being mounted on the crossbeams.

Construction is simplicity itself, being largely a welding job. Channel iron and diagonally laid flatbar cross bracing are used in the chassis. Wooden crossbeams ride up and down on bronze rods to adjust to the depth of the boat. The top view clearly shows the chassis, with dotted lines indicating the position of the boat when it is in place.

When making the padded support blocks, be sure their tops are high enough above the chassis to provide a clearance of at least 3 in. between the bottom of the boat's hull and the wheels of the trailer. In covering the padding on these blocks, use a fabric that won't scratch the paint job on your boat. The centerboard clamps should be insulated from the centerboard by means of sheepskin with the fur left on or felt cemented to the steel.

Standard 34-in. six-leaf 4,500-lb. springs are installed, with brackets for eyes and shackles as indicated. For the axle, a stock secondhand front-end type, with the knuckles welded fast, could be employed. The alternative shown in the drawing, however, will work out better. It is made of square-section solid steel and has flat arms at the ends to which the spindles are welded. Hold the fir or pine 2x3-in. crossbeams in place with wingnuts run on the bronze rods. Drive ¼x6-in. brass pins through slightly undersize holes bored in the mast saddles to take the lashings, made of light line, that hold the mast in place.

The 2½-in. offset between axle and spindle center lines lowers the center of gravity of the rig just enough to insure good roadability at high speeds. •

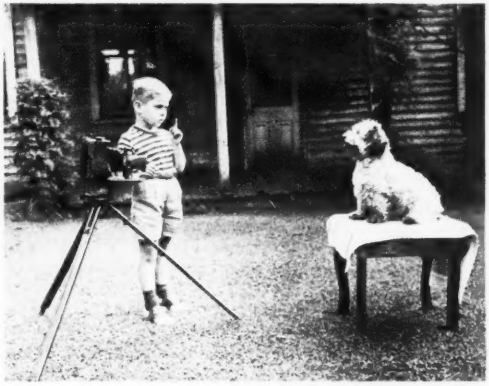
BILL OF MATERIALS

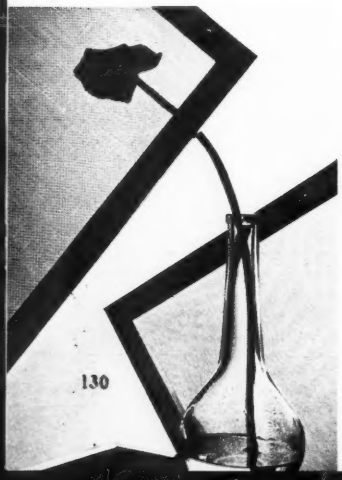
1 ball-and-socket hitch
1 axle assembly, 54-in. tread
2 six-leaf springs, 4,500-lb. capacity
4 large U bolts with nuts
2 wheels with tires and tubes
4 ft. steel 2½-lb. channel
40 ft. steel 5-lb. channel
14 ft. steel ¼ x 1½-in. flatbar
9 lineal ft. 2 x 3-in. fir or pine
6 lineal ft. 3 x 8-in. fir or pine
8 ft. bronze rod, ½-in. dia., with nuts and wingnuts
2 ft. brass rod, ¼-in. dia.
4 studs, ½ x 1½ in., with wingnuts
Padding, padding cover, and padding-cover tacks as required

First Prize ($10.00) .....Soliloquy
Taken by David Linton of N. Y. C.; pan film, 1/10 at f-4.5.

Monthly Photo Contest

Please put your name, address and picture-taking data on back of each print. Wrap with cardboard stiffeners and enclose a self-addressed stamped envelope or postage for return of unused photos. Prize-winning pictures are not returned. Judges are MI Editors. Duplicate prizes awarded in case of tie. Address: Monthly Photo Contest Editor, MECHANIX ILLUSTRATED, 67 W. 44 St., N.Y.C.





"See What I Mean?" A $5.00 Award goes to A. O. Aldrich of Lansing, Mich. for this view camera shot.

"Coquetry," a $5.00 Award winner by D. H. Gleason of Cincinnati. Kodak, pan film, 1/50th at f-5.6.

"Abstract," a still life study by Walter Chandoha takes the third $5.00 Award. Graphic and floods.

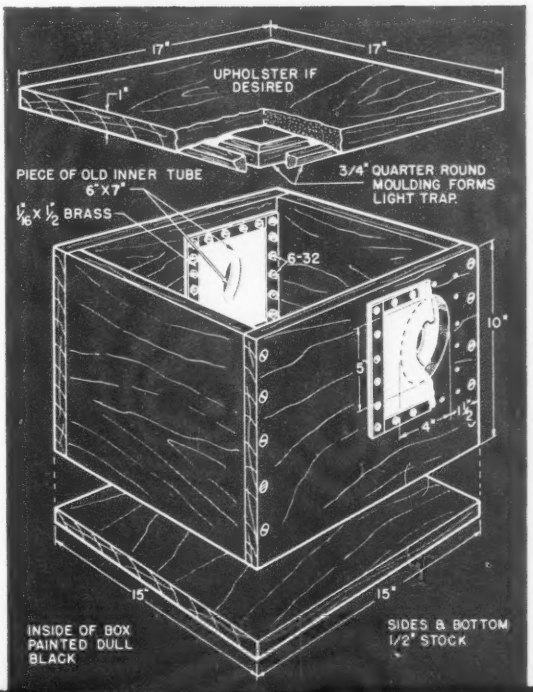
Portable Darkroom

A miniature darkroom for loading developing tanks and cut film holders—just the thing to take with you in your car or house trailer—can be made from a box, some cardboard and a piece of inner tube.

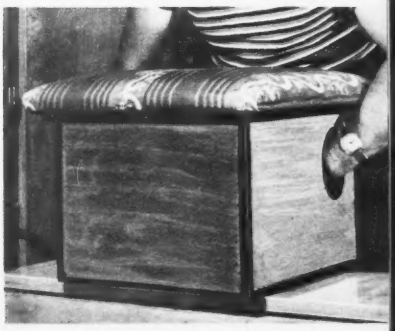
Make the box about 14 in. square and 12 to 14 in. high. This is large enough to permit the handling of a developing tank up to 4x5 in.

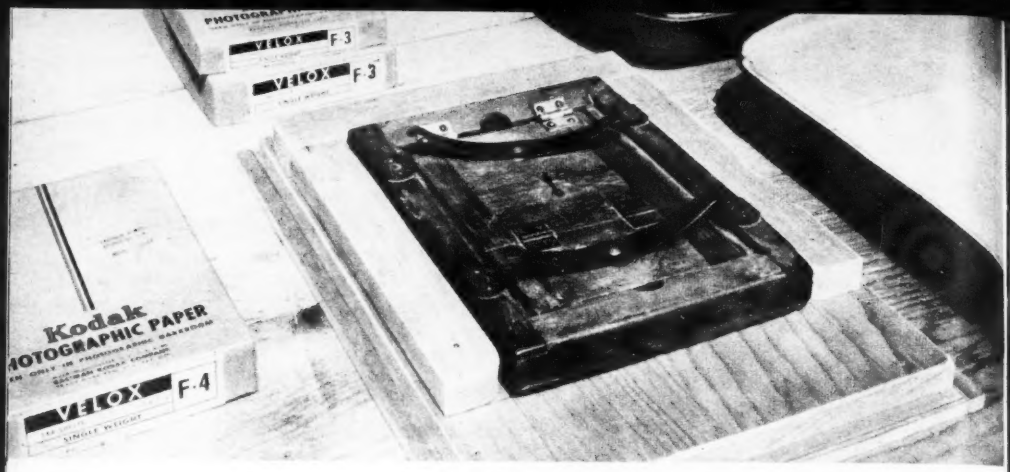
Two handholes are cut in the sides as shown in the sketch. The real trick comes next—the use of a double thickness of inner tube which is put over these holes and then cutting holes in the middle of the double thickness just large enough for the hand to s-q-u-e-e-z-e through. That's the light trap. The hole should be about 1½ in. in diameter. Hold the double thickness of rubber in place with 6x32 bolts.

Next, line the box with black cardboard or paint it black after having made *sure* that all of the cracks [*Continued on page* 148]



Top of the box is covered with several layers of cotton and a piece of damask. Thus, it doubles as a hassock.





built-in printing box

Push the printing frame and, presto! The light goes on automatically to make the exposure.

The entire box is made of ¾-in. white pine. The micro-switch is available as a surplus item from radio and electrical supply houses.

By Dick Hutchison

GRANTED that it's a lot more fun making your own prints rather than subjecting your negatives to the not-so-tender mercy of the local drugstore, still and all, you will find it a good deal easier and still more fun if you can sit down to do this interesting chore.

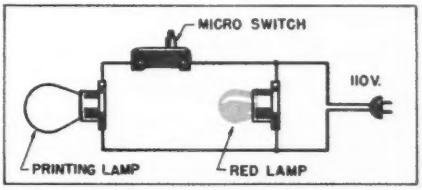
It isn't too much of a job to build this printing box; it will compare favorably with anything you can buy, and, furthermore, it is recessed into the work table so that it is always at hand.

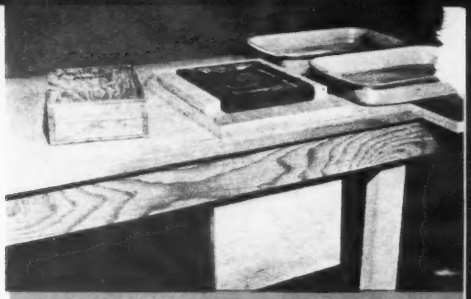
The box is built entirely out of ¾-in. white pine with all insides nailed together. Use porcelain laboratory-type sockets and rubber-covered wire for the electrical system of the box. The micro-switch shown in the drawing at the left is available for about $1.00 from most radio supply houses. Most of these switches are designed to operate with very little pressure so that you will find that a mere push is all that is required to turn on the printing lamp.

The working part of the box consists of a standard 5x7 printing frame which is held loosely in the U-shaped upper framework of the box. At about this stage, you should cut out the required opening in the work table to accept the box. If you use one lamp, make it a 75-watt bulb and diffuse it with a sheet of opal glass. If you decide to use four lamps, then use 25-watt bulbs. Diffusion with the four lamps will not be necessary.

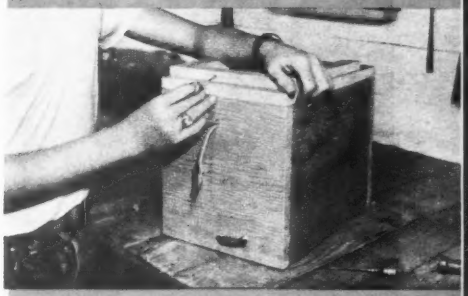
The red pilot light is wired directly to the 110-volt source so it is always "on" when the plug is inserted. This will give you plenty of light for adjusting the mask over the film in order to get white margins.

An interesting feature of this printing box is the way it can be converted into a retouching desk. Merely remove the printing frame and insert a 25-watt lamp in place of a red pilot bulb. •

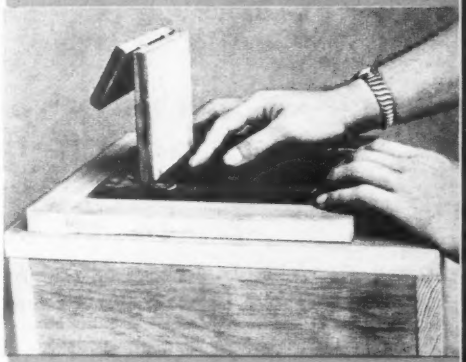




A view of a corner of the work table showing the installation of the printing box. Printer is always at hand when needed and yet never in the way.



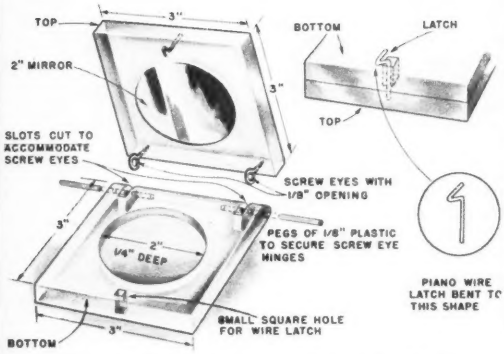
The wires for the micro-switch are drawn through holes drilled through the back of the box. Be sure to seal the holes to prevent any light leaks.



The hinged back of the printing box consists of a standard 5x7 printing frame. This arrangement allows you to remove the frame for other work.

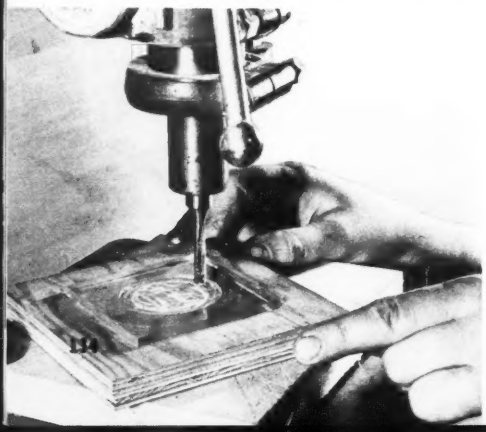
There! Nothing like sitting down to do your work. Printing frame is flush with top of table, thus it requires no extra storage space.

plastic compact

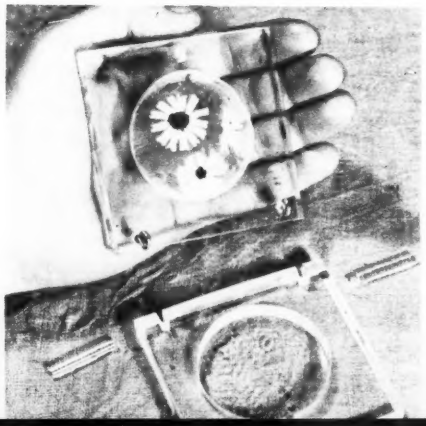


THIS compact is made with woodworking tools. Leave the masking paper on the plastic until through working it. When routing the two recesses, make the one in the lid just deep enough to accommodate the mirror. Polish the recess in the bottom piece and finish the one in the lid with a painted design to hide the back of the mirror. The piano-wire latch is cemented into the lid and its bent end passes through a square hole in the bottom piece. The wire has enough spring to keep the lid closed, yet it can easily be pushed back to allow the compact to be opened. To keep the sparkle, give the job a coat of glass wax. •

Routing the recess for the mirror on a drill press. Powder compartment is routed similarly but should be cut a little deeper. Plastic is held in jig.



Part of the compact ready for assembly. It is made of two squares of 3/8 in. plastic. The edges are smoothed with sandpaper and buffed on a wheel.



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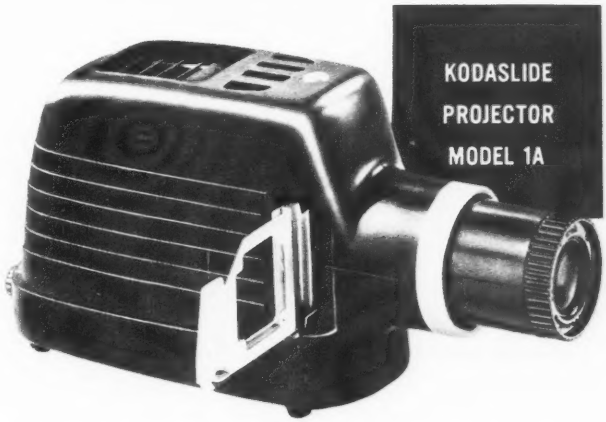

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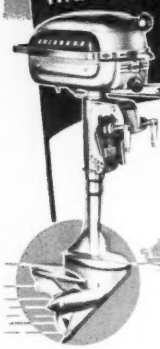

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How to Build RFD

[*Continued from page* 110]

the engine. The coamings and hatch headers are located about as shown on the Deck-Framing Plan (Fig. 4) and are screwed to the beams.

It is a good idea to fit the hatch at this stage and clamp it in place while the deck is faired. The curvature of the deck must be fair both transversely and fore-and-aft. The battens you used to lay out the lines are suitable for fairing the deck. Lay them on the beams; they should lie there with no waviness, no matter in what direction they are placed. Plane and shim as necessary to get the required fairness. When the deck is faired, the notch for the ¾ by 4-in. kingplank is cut and the kingplank itself is fitted, glued, and fastened. Note that it runs forward of the hatch, between the hatch and cockpit, and aft of the cockpit.

When you frame the engine hatch, care should be taken to see that no beams or headers will touch the engine head, carburetor, or other engine parts. The hatch is shown in one piece, but if so desired can be formed in two parts. The hinges or locks can be located to suit; the hatch can hinge at the back, front, or sides. The designer prefers to hinge the hatch at the forward end or to make it removable as a unit, with no hinges at all.

Before installing the deck planking, the dash panel and brackets are fitted. The dashboard, of ½-in. mahogany-faced plywood, is glued and screwed to the forward face of the deck beam 6 in. aft of Frame 9. Two brackets, of ¾-in. fir, are fitted as shown on the Inboard Profile (Fig. 4).

The flooring, of ½x3½-in. fir, can now be cut and temporarily installed. The seat brackets and wedges on which the seat bottom is placed, are next installed. The seat bottom, of ½-in. plywood, is fastened with screws to the brackets and wedges. The seat back is inclined at a suitable angle and should land flat on the canted beam at the after end of the cockpit.

When the seats are installed, the correct angle and location of the steering wheel can be determined. The wheel is a standard drum-type steerer and is fastened to the dash panel about as shown on the Inboard Profile. When it is fitted, the four brackets for the tiller-rope sheaves are located. These are fastened to the frames and transom with suitable screws. On them go the sheaves, properly aligned to lead the tiller rope from the steerer drum to the tiller quadrant.

A standard runabout rudder of cast bronze, having a long rudder stock, is shown. It is

[*Continued on page* 138]

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How to Build RFD

[*Continued from page* 136]

held in two bearings by a pair of suitable lock rings and is squared on top for a standard tiller quadrant. The bearings are of bronze, cast and machined to land properly against the transom and cavitation plate. The rudder stock is 1⅛ in. in diameter and the bearings should be a good fit on the stock. The lower bearing is bolted to the cavitation plate and to the lower transom frame and the upper bearing is through-bolted to the transom stiffener beneath the tiller opening. When the rudder and tiller quadrant are installed, the tiller rope can be fitted. This rope should be a braided or stranded stainless-steel cable, about $\frac{3}{16}$ in. in diameter and turnbuckles should be placed in the lines to keep the proper tension.

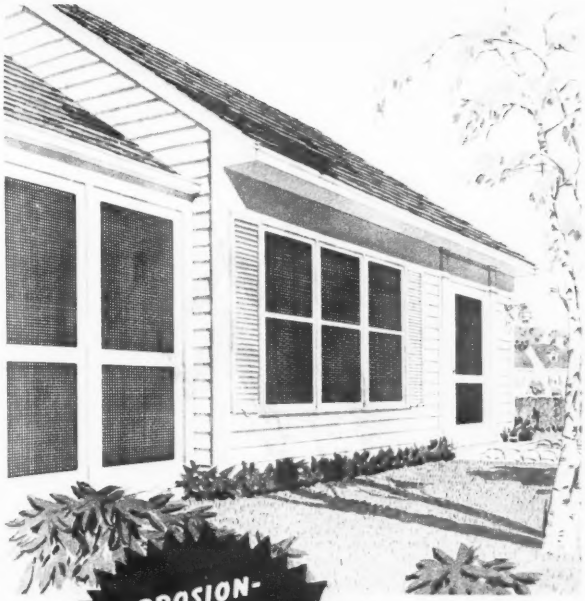
With all the interior woodwork completed, prior to the installation of the engine, the inside of the hull should be varnished. Clean out all chips and dust and wipe down the planking and structure with a clean cloth; then apply at least three coats of good spar varnish. When varnishing the interior of the hull, the flooring and seat structure should be removed. These pieces can best be varnished before being reinstalled. A varnished interior is sign of good workmanship, showing that the builder has nothing to hide beneath coats of opaque paint.

The ¼-in. five-ply mahogany or fir marine-plywood deck can now be fitted. The panels should be as large as possible and butted on the kingplank at the center line. If other butts are required, they should be made on suitable backing strips. Do not attempt to butt two sheets on a deck beam, as there is not adequate room for the required double row of fastenings. The decking fastenings are ¾-in. No. 8 flathead wood screws and are driven as were those holding the side and bottom planking. The Deck Plan (Fig. 1) indicates the fastenings on a portion of the deck. The fastenings are driven just below the surface and surfacing putty is used prior to painting.

The deck is filled, sealed, and painted in the same manner as the sides and bottom. About now you should write for your racing number. The American Power Boat Association, 3733 Barlum Tower, Detroit, assigns these. The number is painted on the sides of the boat together with its name. There is no rhyme nor reason in the choice of raceboat names, some Crackerboxes carrying appellations such as *The Wounded Turtle, Alley-Cat II, Putsi-Putsi, Ski-Bee,* and *Twerp.*

Now all that remains to complete the hull

[*Continued on page* 140]



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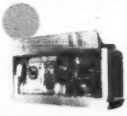

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How to Build RFD

[*Continued from page* 138]

is to put in the gas tank, bolt on the fin, and install the engine. The fin is located, as shown on the Inboard Profile, between Frames 5 and 6 and is secured through the keel with four ⅜-in. bronze strut bolts.

The engine installation will vary with the type engine chosen, but there is no great trick to setting an engine in a boat. Be sure that the coupling is exactly parallel and in line with the shaft coupling before anything is bolted down. Even then, there is always the possibility that the engine and shaft will be out of alignment when the boat is launched; so final-align shafting after boat is afloat.

The water scoop is located well aft and should lead, through flexibly mounted pipes, in easy curves to the water pump on the engine. The piping should be at least ¾ in. in diameter. The exhaust piping is run to one side of the cockpit and around the gas tank through the transom. Standard exhaust flanges should anchor the pipe in the transom. The engine cooling water is run into the exhaust pipe right at the end of the manifold.

The clutch control is shown on the Inboard Profile. A ½-in. rod with a clevis on one end and a gear-shift knob on the other is passed through a bushing in the dash panel. The bushing should permit a bit of vertical play as the rod is moved in and out. The clevis is pinned to the clutch lever on the engine. The rod and collar should be chromed; any auto-supply store can supply the knob.

The fuel connections, battery, tachometer, throttle, and instruments are quite normal. Put some gas in the tank, some oil in the crankcase, and some cushions in the cockpit—and you're ready to go!

Fill up your camera with film and trail your boat to the dock. This reminds me of what an old boatbuilder once told me about launching parties for racing craft. He was dead set against the use of champagne.

"Champagne," said he, "is to be taken slowly, and with waltzing. No raceboat should be christened like that!" As the crane at his boatshop dropped a raceboat in the water, he would dash a shot of good rye against its stem and then take a quick slug of the rye as a toast to his latest creation. "A quick toast makes a quick boat," he'd say—and his reputation upheld his actions.

The trial trip will amaze you. As your engine idles at the dock, check the water intake, the shaft alignment, the temperature, and the instruments. When all is satisfactory, push her nose out, put in the clutch, and step on the gas. Happy boating and good racing! ●

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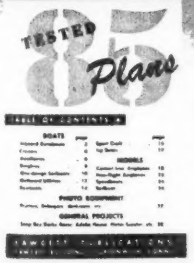

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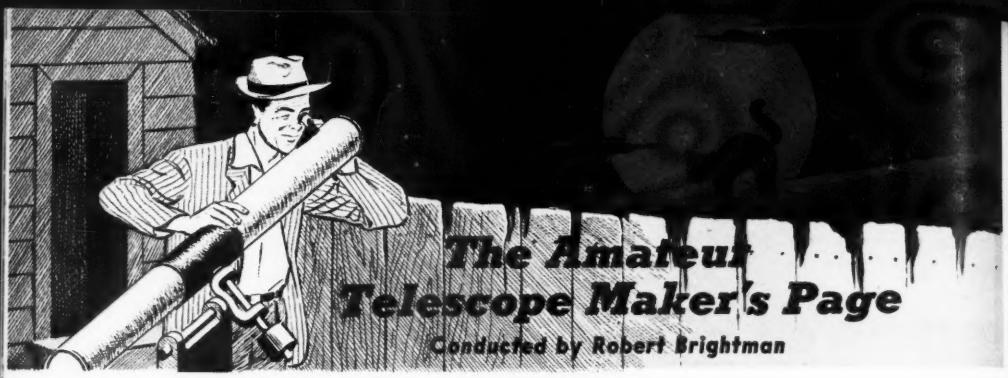


The Amateur Telescope Maker's Page

Conducted by Robert Brightman

Mountings

TOO often a worker will complete a superb telescope and then, in his haste to use it, will construct a flimsy mount. You can actually see more with a poor mirror and a husky mounting than with a good mirror and a shaky mounting. Having spent many an hour walking around a barrel polishing your mirror, you may as well devote a few more hours to the construction of a really rigid mount for your telescope. *We cannot emphasize too strongly the necessity for extreme rigidity in building your telescope mounting.*

In general, there are three types of mountings in common use; the German, the double yoke, and the English type.

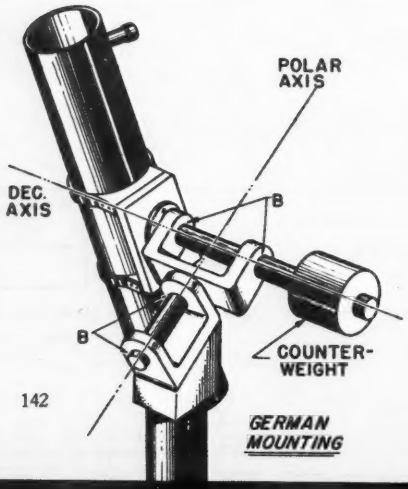
The German type of mounting is probably the most popular and has comparatively few drawbacks. The tube is swung on an outrigger and all parts of the heavens can be viewed without any mechanical interference. Its only drawback, if such it can be called, is the need for a counterweight on the opposite side of the polar axis to balance the telescope tube and its various parts.

The double yoke mounting does away with the need for this counterweight. However, a part of the northern sky is inaccessible to the observer. It is interesting to note that the second largest telescope in the world, the 100-inch at Mt. Wilson, uses this type of mounting.

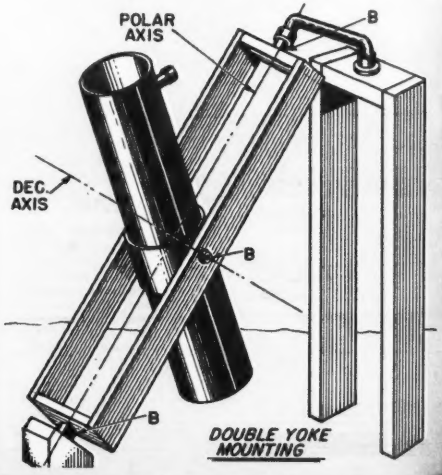
A third type is known as the English mounting. This particular style has no counterweights. The tube is engaged at its balancing point so that it will stay put when pointed in any desired direction.

If you are planning to mount your telescope permanently outdoors, the bottom of the mount should be set in a concrete pier. Excavation for pier should be below the frost line to prevent heaving.

Are you wondering what type of mounting the Mt. Palomar giant uses? It is none of these; this 200-inch telescope uses a split equatorial ring, a sort of modified double yoke mounting. •

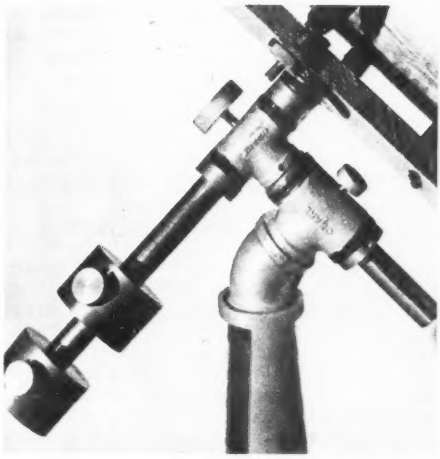


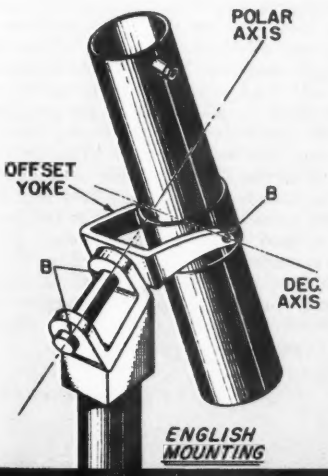
GERMAN MOUNTING



DOUBLE YOKE MOUNTING

Finished workmanship is evident in this 'scope built by S. B. Allwell of Baltimore. Column is part of a war surplus range finder. Tube is secured to saddle at center with a steel strap.





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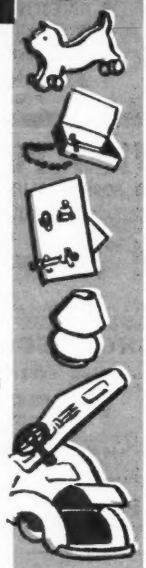

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[*Continued from page* 126]

surprisingly low cost. The arbors are not hard and can be easily altered.

Mount the arbor between centers and turn the .393 in. diameter $\frac{11}{32}$ in. long for a light press fit for the I. D. of the ball bearing. The ball bearing, Fig. 4, is of the radial and thrust type (New Departure Bearing No. 20200 D.B.) but any similar make can be used. The I. D. is .393 in. and the O.D.I. .1802 in. The bearing housing, Fig. 2, is made of 1⅝ in. diameter x ¾ in. bar stock which is first chucked and faced off. It is then bored out for a push fit for the O. D. of the bearing. Caution when boring must be observed as binding of the bearing race will result if a press fit is used. By the same token, a fit that allows any clearance between the bearing and housing bore will impair the accuracy of the finished tool. The depth of this bore is also important and should be .001 in. less than the width of the outer race of the bearing. By boring the hole to a depth of .353 in. the outer race of the bearing can be securely locked in the housing by means of a retainer plate, Fig. 3. By boring a trifle deeper, then facing off the end and measuring with a depth gauge, the proper depth can be obtained.

The other end of the bearing housing is now bored out to a .375 in. diameter hole by chucking it in a 3-jaw chuck and then rough drilling a $\frac{5}{16}$ in. hole through this face and into the bearing bore. Remove the housing from the chuck and then chuck a short length of round stock which is faced off and turned down to a wring fit for the bearing bore diameter. The housing is then wrung onto this true arbor and faced off, after which the .375 in. diameter hole is finish-bored to size. The concentricity of this hole and the previously finished bearing bore is a critical point in the trueness of the finished tool. Lastly, the angle is turned on and a light clean up cut taken on the O. D.

The 60-degree male center, Fig. 5, is now machined from ½ in. diameter tool steel, preferably an oil hardening type. The 60-degree angle and the .375 in. light press fit diameter are turned in the same chucking, by first turning the 60-degree angle and then using a left hand turning and facing tool to machine the .375 in. diameter. The part is now cut off to the $\frac{11}{32}$ in. shoulder dimension, chucked on the ½ in. diameter and the .375 in. diameter rounded off at the end to facilitate pressing it into the bearing housing hole. The supplementary female center, Fig. No. 6, is also made from tool steel. Here again concentricity of the .375 light press fit. Dia. and the female center is important. After

[*Continued on page* 146]

Legalize Mercy Killing?

[*Continued from page* 61]

anguish for him. We hoped and prayed for a miracle but it did not come. So one day I sent my wife out on an errand, took some chloroform which I had bought at a corner drugstore and applied it to my son's nose with a handkerchief. I watched him die peacefully."

One of the most pathetic arguments for mercy killings was a public plea printed recently in the Letters to the Editor column of the Syracuse Post-Standard. It was a letter from W. J. Corwin of Oswego, N. Y., and it told how he was suffering from the ravages of spastic paralysis:

"During the last five years of my 61, spastic paralysis has slowly developed so that my voice and all motor controls are gone except for some slight movement of my hands. I am about as helpless as during the first few months of life. Doctors at the Mayo Clinic in Rochester told me there is no cure for me.

"I am completely paralyzed and unable to move or speak to indicate which muscles are cramping with excruciating pain. A society refusing the judicious use of euthanasia is guilty of barbarism more cruel than the stocks of colonial days."

The writer was able to use his hands just enough to scrawl his message laboriously to the newspaper.

A cogent argument in favor of euthanasia lies in the fact that the law exacts a life for a life in its system of capital punishment.

How can we say that "only God may take life," the point is made, when man himself kills legally?

And this line of reasoning is carried through to include the massacre of man by man in warfare. Millions are slain in combat, the proponents of euthanasia point out, while church bells ring and clergymen bless the slaughter in the name of God. "Nevertheless, a man writhing in agony on a sickbed is denied a speedy end because only God can give or take life," the Society says.

Dr. A. L. Wolbarst of New York, treasurer of the Euthanasia Society, advances the argument in the Medical Record that doctors through the ages have dedicated themselves to the control of pain wherever possible. The introduction of anesthesia was hailed as an unparalleled boon to mankind and years of effort went into the discovery of sedative medicines to make illness more bearable.

Therefore, Dr. Wolbarst concludes that mercy killings are the most recent logical development in the direction of sociological betterment. Says the doctor:

[*Continued on page* 147]

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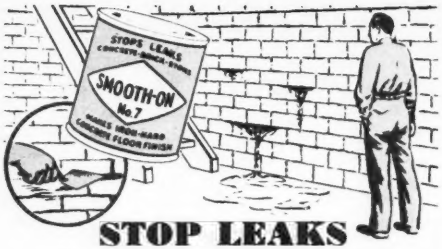

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Live Center

[*Continued from page* 144]

chucking the stock, face off the end and drill a $\frac{1}{16}$ in. deep hole of a $\frac{5}{16}$ in. diameter into the end. Now a 60-degree angle is bored by swiveling the compound to 30 degrees using a small pointed boring bar. Machining this center with a center drill will not do; boring is the only positive way to maintain concentricity of the .375 diameter which is now turned and the part finished in the same manner as the male center.

Although these last two part pieces, Figs. 5 and 6, do not have to withstand wear from work revolving in or around them it is wise to harden them. They can be hardened by using a blow torch or the flame from the ordinary gas range. Hold each part with a piece of soft wire or a pair of long handled pliers, and heat to a cherry red. Then quench vertically in oil or water, depending on whether an oil or a water hardening steel has been used.

The parts should now be polished on the lathe with fine emery paper and then drawn to a dark straw color. This is done by slowly revolving each piece over a low flame and gradually heating until a dark straw color appears, at which time the piece should be immediately quenched. If fish oil is not available for quenching then a heavy grade of machine oil will do. The bearing retainer plate, Fig. 3, is made from 1⅝ in. diameter bar stock. It is first faced off on both sides and then a $\frac{11}{16}$ in. diameter hole is drilled through the center and bored out to a slip fit over the largest diameter of the taper arbor. The three holes for the 5-40 Fillister or Allen head screws are drilled on a 1⅜ in. diameter with a 9/64 in. drill and a $\frac{7}{32}$ in. counter bore, to a depth of ⅛ in. The retainer plate is now clamped to the bearing housing and the 9/64 in. holes are spotted from the plate into the housing. The pieces are taken apart and the spotted holes in the bearing housing drilled with a No. 38 drill ⅜ in. deep and then tapped 5-40. The bearing housing has a No. 38 drill also tapped 5-40.

Going back to the taper arbor, place it in the tailstock spindle, then, chucking a ⅛ in. drill in the 3-jaw, drill a hole through the length of the taper arbor. Remove the arbor from tailstock and tap the one end 8-32, as shown. Before starting to assemble the parts a small amount of white lead, thinned down with oil, should be applied to all parts that are to be pressed or pushed together. This will lubricate the surfaces to be fitted together and prevent tearing of the metal or "freezing" together of the parts.

Assembly is best accomplished by using the

[*Continued on page* 148]

Legalize Mercy Killing?

[*Continued from page* 145]

"Euthanasia seeks to establish the right to die peacefully and painlessly when life has run its course and living death only remains."

Trenchant as these arguments are, the opponents of euthanasia have equally powerful and equally moving facts to rack up on their side.

Medical societies in the state have passed blunt resolutions condemning the legislative attempt, clergymen have risen in the pulpit to denounce it, lawyers and laymen have added their voices.

After the 379 clergymen submitted their petition to Albany, a powerful medical society in Brooklyn followed it swiftly with a resolution demanding that the lawmakers turn thumbs down, declaring:

"Life is God-given and precious. We believe implicitly and without reservation in the commandment and Biblical injunction: 'Thou shalt not kill.'"

Dr. Morris Fishbein, editor of the Journal of the American Medical Association, stands in four-square opposition to the bill.

"I am unalterably opposed to the legislation of voluntary euthanasia," he declared recently, "because no one yet has been able to devise a law authorizing this act without placing full responsibility on the doctor."

Medical scientists opposed to mercy killings point to the marked strides in the art of healing. Strong hope is being held out for even the most advanced cases of mental deficiency. Glutamic acid is being tried extensively and encouraging results are resulting. A delicate brain operation has been reported which may be able to deaden almost all incurable pain.

A shattering experience of curing the incurable came recently to a doctor in a Chicago hospital. The patient was suffering from advanced uremia, a disease caused by an accumulation of urinary waste products in the blood. He had frightful headaches, was growing blind, went into frequent convulsions and had entered a coma around midnight.

The doctor was convinced that the patient would die before morning. About 2 a. m. he was summoned to the bedside. The patient, a 60-year-old man, had regained consciousness, was in agony. He begged for death; he screamed for release. But the doctor's hands were tied by the law.

Two hours later the patient had again slipped into coma and the doctor withdrew.

In the morning, he returned to the room, expecting to make arrangements for disposal of the body. He found the man propped up

[*Continued on page* 149]

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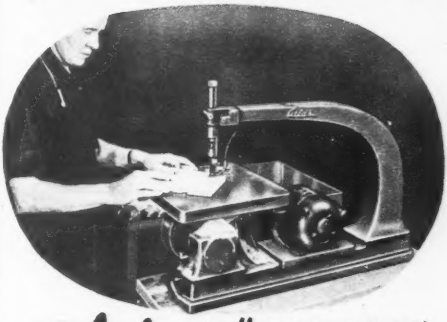

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[*Continued from page* 146]

lathe as an arbor press. Holding the parts against the face plate and, using the tailstock spindle, screw and handwheel to obtain the necessary leverage. This will insure proper fitting together. First insert the taper arbor into the tailstock spindle and, holding the ball bearing against the face plate, press them together. Leave this sub-assembly in the tailstock and hold the bearing housing against the face plate. Then push the sub-assembly into the hole provided for it in the bearing housing. The bearing retainer plate, Fig. No. 3, is slipped over the taper arbor and fastened in place with three 5x40 Fillister or Allen head screws, after the arbor, bearing and housing are removed from the tailstock.

So as not to damage the male center, place the assembled parts in the tailstock once more and then place the female center over the male center. Holding them against the face plate, press home the parts. Insert a 5x40 setscrew into the oil hole provided in the bearing housing. Then insert an 8x32 setscrew into the tapped hole in the end of the taper arbor. These setscrews will prevent any dirt or chips from getting into the ball bearing. •

Portable Darkroom

[*Continued from page* 131]

are sealed. If cardboard is used, put a strip of black passe partout along all of the inside corners. The cardboard lining covers the double thickness of rubber around the holes. Cut hand holes in the cardboard lining to match the holes in the sides of the box and tack the lining around these holes.

The top of the box is removable and has a light trap around the edge made of ¾ in., quarter round, mitered at the corners and caulked with plastic wood. The inside of the top can be easily blackened with "coach black," diluted with turpentine.

Top is upholstered with several layers of cotton and a piece of cloth.

Another interesting wrinkle for this "darkroom" is its use as a cover when developing film in trays. All you have to do is remove the top and upend the box over the trays. To expedite this work, however, you should build some sort of a narrow shelf along one side. On this shelf you can do your unloading and then transfer the film to the developing tray below. Make sure that the bottom of the box is light-tight; use heavy black felt.

We now have a changing box, hassock, and catchall for about a bushel of photographic gadgets. •

Legalize Mercy Killing?

[*Continued from page* 147]

in bed, the pain receded, the climax past. The one-in-a-million miracle had occurred. He was going to live!

"What if I had administered a mercy death to this man?" the doctor asked himself, and shuddered.

How would mercy killings be carried out if the law is passed? Any sane person over 21 years of age would be able to sign a petition for euthanasia if, according to the proposed law, "he is suffering from severe physical pain caused by a disease for which no remedy affording lasting relief or recovery is at the time known to medical science." The petition would have to be signed by a doctor and accompanied by an affidavit from him that the disease in his opinion is incurable.

Here is the petition which the sick man would sign:

> I..... residing at ..... hereby declare as follows: I am ..... years of age and am suffering severe physical pain caused, as I am advised by my physician, by a disease for which no remedy affording lasting relief or recovery is at this time known to medical science.
>
> I am desirous of anticipating death by euthanasia and hereby petition for permission to receive euthanasia.
>
> signed .....

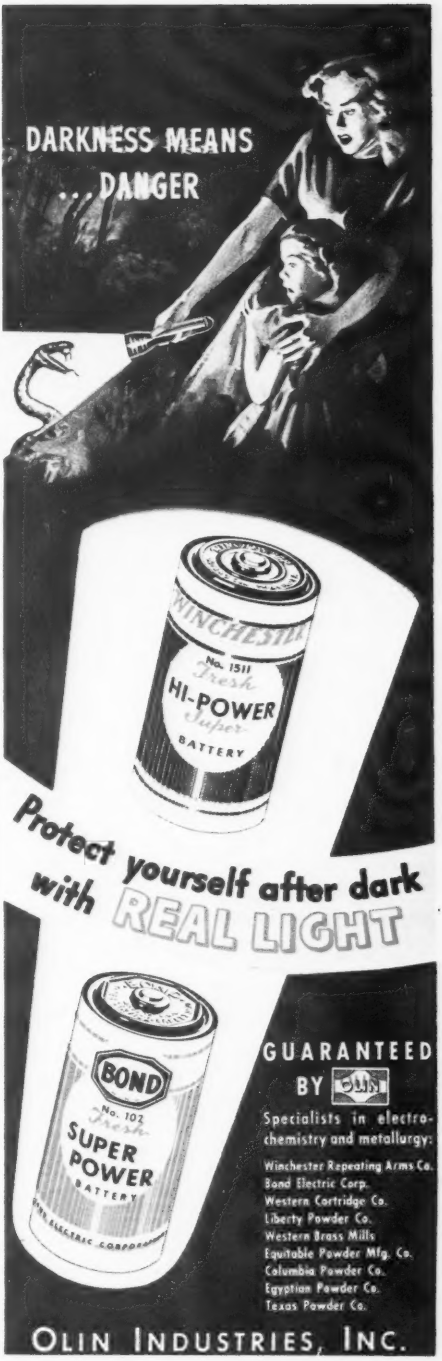
The petition would be addressed to a court of record which appoints a commission of three persons, at least two of them doctors, to investigate the case and report to the court whether the patient understands the law and comes within its provisions.

If this group reports favorably, the court would grant the petition and the mercy killing carried out.

An important fact is that the bill is not mandatory. The petition must originate with the patient and he may change his mind at any time, even after the petition is granted by the court.

The actual method of administering a mercy death would be simple. The Euthanasia Society states that it would probably be done with an injection of a potent narcotic dose. The patient would slip into a painless coma, followed rapidly by death.

And so there stands the case for legalized mercy killing. What do you think? Is it murder or a blessing? Is it a leap backward into barbarism or is it a step ahead in preserving the dignity of mankind? •



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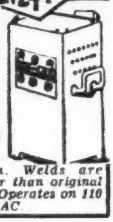

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[*Continued from page* 122]

United States alone. This figure represents only the currently licensed people; there are probably five times that number who have held licenses at one time or other, or hope to get them, or are just hams at heart and follow the game by listening in regularly.

The government encourages ham radio because hams contribute greatly to the advancement of radio in times of peace and are invaluable to the military services for their technical experience in times of war. Uncle Sam doesn't care whether you're male or female, young or old, strong or infirm, active or bedridden. As long as you are a citizen of the United States, can send and receive reasonably well in Morse code, are familiar with radio laws, and know something of the basic theory of radio circuits, he'll gladly give you a ham "ticket" with his blessing.

Tests are given regularly at about 60 FCC offices scattered over the country. A list of the offices is contained in a little pamphlet entitled The Radio Amateur's License Manual, published by the American Radio Relay League. This costs 25c and can be picked up at practically any radio-supply house.

If you live within 125 miles of an FCC office, you must appear in person for the test. If you pass it, you receive what is called a Class B license. This permits unrestricted code operation on all amateur bands and voice operation on bands above the frequency of 27,160 kilocycles. If you live more than 125 miles from an office, you can apply for the test papers by mail and take the examination in the presence of an already-licensed operator. The same privilege is extended to bedridden patients and shut-ins. Even blindness is no bar; some of the best operators on the air got their tickets by dictating their answers to the questions and explaining circuits instead of drawing them on paper. The mail-order license is called Class C and carries the same privileges as the Class B. Technically, it is only a provisional license, and the holder must take a personal test if he moves within the 125-mile circle or if the FCC announces tests in his area.

Regardless of where you make your permanent home, you can take the ham test in any FCC office if you happen to be near it when it is open for the purpose. The employees only *give* the tests, they don't have the job of grading the papers. These are mailed to the main FCC office in Washington, where they are handled with complete impartiality. If you fail, you'll get a form notice in a couple of weeks. If you pass, the license itself will plop into your mail box in about a month.

The word "examination" makes most people feel uncomfortable because it has a childhood association with rigid school tests. The FCC exam isn't like those at all. The Commission is happy to have you take it. The examiners, almost all of whom are hams themselves, are extremely helpful and do everything possible to put the nervous applicant at ease. I couldn't help but notice this spirit when I spent a day recently at the FCC office at 641 Washington Street, New York, where the accompanying pictures were taken. To prepare you for your own visit someday to an FCC office, let's go through the routine step by step, as I saw several dozen young men do.

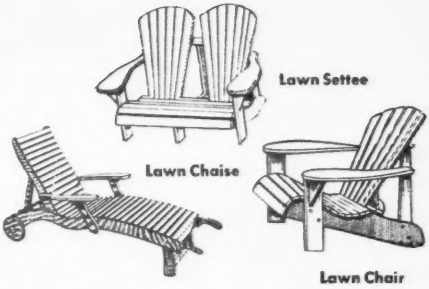
You walk through a door marked "Federal Communications Commission—Radio Operator Examinations" and state your business to an official. He reaches into a desk drawer for FCC form 610, which you fill out at a nearby table. This is a simple application form on which you state your name, address, place and date of birth and citizenship status. This writing shouldn't take more than five minutes. You hand the form back to the examiner, who checks it quickly. Then he hands you a couple of sheets of blank paper and leads you into the examination room. You sit down at a small desk and find in front of your earphones and a telegraph key. You are to take the code-receiving test. For five minutes you hear characters transmitted by a tape machine. The speed is exactly 13 words per minute. The text consists of common words, but doesn't necessarily make sense; and it contains random numbers and Q signals, which are international abbreviations. This is done to prevent you from guessing. You have no time to go over your "copy" and correct it. The examiner is at your shoulder as the transmission ends. He compares your paper with a master copy. If you received any *one continuous minute* of the transmission without error, you are OK.

After passing the receiving test, you send a message while the examiner listens on earphones. He can tell in a few minutes if your sending is acceptable.

Finally, the examiner hands you a sealed envelope marked "Examination for Class B Amateur Operator Privileges." The cover contains instructions. You tear it open and remove five sheets on which are 50 questions of the multiple-choice type. About 30 of these cover technical matters; the balance are concerned with radio laws.

There are some diagrams to draw and a bit of elementary arithmetic to perform. Don't rush. You can take all day, but must finish at one sitting. You can't interrupt to go out for lunch. An hour is a fair average, although some applicants have taken three.

[*Continued on page* 165]



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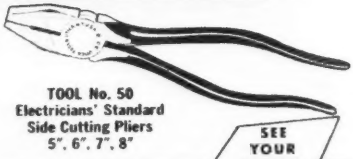

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Fire—Origin Unknown

[*Continued from page* 64]

up enough of a charge so that the wool was crackling with sparks. An instant later the trousers burst into flame. Fortunately the farmer was a fast man with his pants and avoided injury.

The amazing frequency of fires started by human "spark plugs," firemen know, arises from the fact that most people are not aware that they may be highly charged. The condition is so prevalent that many chemical plants make a daily test of workers who handle volatile fluids. If they've got too much juice, home they go.

One person's battery cells may be better than another's. A woman "lightning bug" working in a shoe factory in upper New York State sat at a bench where she applied rubber cement to soles before stitching. People around her were doing the same thing. Yet, for no particular reason, this particular worker's cement bucket burst into flame one day. No one paid much attention until it happened twice more in a month. Then plant officials regarded her with half-closed eyes, and spies were set to watch for any move that might suggest sabotage.

Finally, the woman's bucket blew up for the fifth time, sent her to the hospital and burned a large section of the shop. Workers who replaced her had no trouble with the cement. But back on her feet a month later, old "lightning" hadn't been at the job 15 minutes when bang went the bucket again.

This time fire sleuths from an insurance company ran her through some tests and discovered that she was a walking Roman candle. By wearing rubber-soled shoes, she had insulated herself. The current she generated, therefore, did not run off into the ground as it would normally but stored itself in her body and grounded off with sparks on everything she touched. The company transferred her to a better insulated job. And that was the end of her "lightning" career.

Everyone admits the danger of sparks in the vicinity of vapors from such things as gasoline, kerosene, naphtha and ether. But few consider themselves as the source of the sparks, nor are they aware of the truly dangerous and tricky nature of such vapors.

Fur is a particularly good generator of static electricity. That is why animals frequently have been the cause of strange fires. Chief James R. Eldridge of the Binghamton, N. Y., Fire Department, investigated a blaze that had completely demolished a large garage in town. He got nowhere.

Then, by chance, he noticed a small boy poking around the ruins. Just to be friendly,

the Chief asked the youngster if he knew how the fire started. The boy startled him by quietly admitting that he did, indeed. He was sitting near a pail of gasoline used for cleaning car parts, he said, and was petting a big shaggy dog.

"Every time I patted him," the boy grinned, "sparks flew from his fur. I kept petting him so I could see the sparks. Then one of them flew over by the gas pail—*and boom!*"

The static potential in animal fur is so great that it presents a real problem in city pounds. Sparks from the fur of cats and long-haired dogs have caused terrific explosions in the gas chambers used for killing unclaimed strays. Spokane, Wash., and Providence, R. I., are two cities where this happened. New York finally banished its animal gas house when it exploded for the last time about ten years ago, blowing up a large section of the building and maiming an attendant.

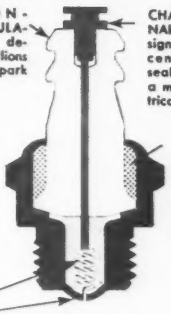
Equally as destructive, and certainly as weird as static-electricity blazes, are fires caused by spontaneous ignition. Many people have seen barns and grain bins burst into flame for no apparent reason. Spontaneous combustion is the cause of the great majority of barn fires. The 1935 floods in Vermont were followed by an epidemic of such blazes. Scores of haystacks that had been standing in the flooded fields heated and burst into flame as soon as the high water began to recede. You could dig your hand into a pile of hay and feel the warmth from the smoldering that had started in the center of the wet piles. One farmer spread out such a stack and thoroughly cooked a dozen eggs on it.

What causes spontaneous ignition? The natural process of oxidation that goes on in everything. It's what rusts metal and rots wood. The process involves a change in substance, usually a chemical change, resulting in generation of heat. Even ordinary rusting produces an infinitesimal heat. But some things, like vegetable or animal oil, oxidize fast. That's why an oily rag is so dangerous. Any stacked material may heat (a barrel of oily iron filings once got so hot that the barrel burned)—and burn when the combustion point of the material is reached. For such blazes a combination of factors must be present—moisture content, chemical action, or bacterial action if the matter is organic. A lot, too, depends on the size and density of the pile. The bigger and tighter-packed the material, the hotter it gets.

Where most people make a mistake is in thinking that spontaneous ignition confines itself to hay, grain, ice-house sawdust, peat moss and similar farm materials with which they always have associated it. Not so. One of

[*Continued on page* 154]

ANNOUNCING CHAMPION V GLOW PLUGS



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"V" GLOW PLUGS	VG-1	VG-2	VG-3
"V" SPARK PLUGS	V	V-2	V-3
HEX	½"	⅜"	5/16"
THREAD	3/8"-24	¼"-32	¼"-32
THREAD LENGTH	7/32"	7/32"	5/32"
"V" GLOW PLUGS WEIGHT, GRAMS	VG-1 8.7	VG-2 3.7	VG-3 2.8
"V" SPARK PLUGS WEIGHT, GRAMS	V 8	V-2 3½	V-3 2½

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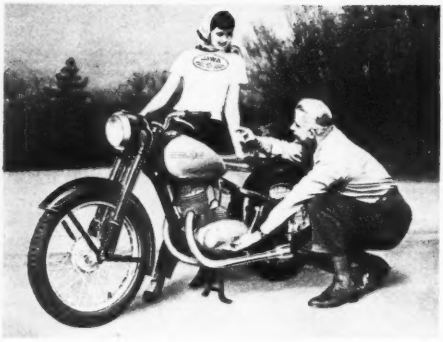

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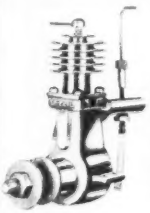

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Fire—Origin Unknown

[*Continued from page* 153]

the most potent seedbeds for this type fire is the commonplace American cellar.

In a recent Underwriters' analysis of 7000 fires it was found that more than 2200 began in cellars. And back in 1930 the Fire Department of Providence found out why. In an unannounced series of late fall inspections of cellars, they turned up hundreds of tons of newspapers, paint rags, cartons and trash of all sorts. But, worst of all, they found 500 Christmas trees still left over from the previous Christmas and 3500 old mattresses. All this junk was stowed away in cellars that frequently were damp and badly ventilated.

It doesn't take a big pile of stuff with massive weight to start the spontaneous ignition process. With other conditions just right, a single newspaper in the cellar can warm up to the combustion point. Newspapers contain printer's ink, and that contains lampblack—a highly combustible carbon. One man, with a pile of newspapers about a foot high on a cellar shelf, noticed that they seemed awfully warm one night. When he took them down, he found a round hole about six inches in diameter already burned out of the center of the pile. They burst into flame as he pulled them apart.

Insurance-company records are full of cases in which fires have burst out in such prosaic things as a single silk dress in a box in an attic; a bag of floor dust in a trash can; a mattress on a bed in which a sick person had spilled some oil or camphor; an oily floor mop in a broom closet; a single pair of paint-stained overalls hanging on a nail (these burned an hour after they were hung up); an old piece of burlap on an enamel-top table. You can test the spontaneous ignition process yourself by soaking a rag in oil and leaving it in a warm closet near a steam pipe. If moisture and oxygen conditions are just right, you'll burn down the house with no trouble at all.

Of all the fires that go down on the books under Origin Unknown, probably a tremendous percentage could be attributed to this cause—if we only knew.

There are other types of strange fires, too. One, quite common, involves lenses and reflected sunlight. Thousands of fires can be laid to this odd cause. A recent one in New Rochelle did $10,000 damage to the upper floors in the residence of William A. Lydgate, Gallup Poll editor.

After a brief investigation, Fire Chief Arthur Fawcett of that town discovered that the blaze was started by a magnifying glass which the editor's 11-year-old son, John, had

[*Continued on page* 161]

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Home Needs 50 Keys

[*Continued from page* 107]

If this has been omitted, you can apply a coat of commercial damp-proofing compound to the interior walls.

5. *Basement Floor.* Not every floor is put in over an adequate cinder fill, and frequently the floor is too thin or the mixture is too lean. To check, tap lightly with a hammer. If the sound is uniformly flat, chances are that the concrete is thick enough and laid over a tamped-cinder fill. Beware of hollow sounds.

6. *Floor Drain.* Note the slope of the floor to see if water will run toward the drain. Today, too many builders neglect to pitch basement floors.

7. *Support Columns.* These take the weight that isn't supported by the foundation walls. Each column should be set on a footing. To know whether you have enough columns, check their spacing with the accompanying chart showing allowable spans of floor joists.

8. *Floor Joists.* All traffic bears on these; so you want the most possible strength here. The cheap house has undersized or too few joists. Although able to support ordinary loads, they lack stiffness and rigidity. Also, a builder may save by installing green or inferior lumber, gambling that the buyer won't know a good joist from a bad one. If a house is under construction, you can check the grade of lumber used by examining the stamp found on the end of each piece. The stamp is put there by one of the lumber-manufacturers' associations. Typical stamps are shown in the accompanying drawings. See that the joists are 8 to 10 in. deep and spaced no more than 16 in. on centers. Joists under partitions and floor openings should be doubled and sometimes even tripled.

9. *Sill.* Along the top of the foundation is the sill, a flat timber on which the joists rest. This should be bolted to the foundation.

10. *Bridging.* Too often overlooked for economy's sake, these little diagonals prevent the joists from twisting under sudden loads and jolts.

11. *Subflooring.* This is secured to the joists, providing a nailing surface and proper foundation for the finished floor, which comes later. For best service, it should be laid diagonally.

12. *Nails to Joists.* If you would avoid creaking, bulging floors, see that enough nails are driven through the subfloor to hold it in forever. In 4 or 6-in. boards, use two nails per board at each joist.

[*Continued on page* 156]

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Home Needs 50 Keys

[*Continued from page* 155]

13. Tile. Special framing is required under rooms that are floored with marble or cement tile. The structure must be sunk to allow for the extra-thick surfacing and bridging should be closer spaced.

14. Studs. The essentials here are strength and rigidity because the walls not only carry the second floor and roof, but also withstand the sideward thrust of the wind. Stud spacing of 16 in., center to center, is standard.

15. Corner Bracing. Rigidity is largely dependent on these diagonal members, which run from the corner posts down to the sill. The intermediate studs are notched to take them.

16. Fire Stops. Although newer techniques have largely eliminated the need for fire stops, some two-story structures still have open passages where the rafters meet the second-floor studs. Not only do fire stops prevent hidden flames from spreading through the openings, but they add structural strength as well. If there is insulation in the walls, fire stops are not necessary.

17. Window and Door Framing. You need windows and doors, but the house should not be weakened by cutting out for them indiscriminately. Strength must be retained by

[*Continued on page* 168]

Flap Your Wings—Fly

[*Continued from page* 68]

firmly in place during any flying maneuvers.

The wings, designed for easy soaring, attach to the roots at two hinge points. The rear attachment is movable and adjusts to the proper angle as the pilot pulls back the control stick to climb. Automatic leading-edge slots provide an additional guard against stalling. Propulsion and lateral control is similar to that of the large soaring birds. This control consists of a set of big "propeller feathers projecting from the end of each wing. A device like the cyclic-pitch mechanism in a helicopter keeps the prop feathers at correct pitch at all angles, with an override to permit manual trimming by the pilot.

The tail, like that of a bird, combines the functions of horizontal stabilizer and elevator. Aerodynamically balanced for easy operation, the tail has a spring setup to bring it back to a level-flight position when the pilot's releases control. The rapidly beating wings and the fanned-out tail slow the ornithopter down to almost zero air speed for hovering or landing. The trailing edge is reinforced so that it can also serve as a tail skid during takeoffs and landings.

The main landing gear, though, is a pair of long, tubular legs, each equipped with a small, low-pressure wheel. A simple spiral spring and plunger rod, enclosed within the tube, absorbs landing shocks. In flight, a hand-controlled cable folds the legs back into wells on either side of the fuselage.

Like a giant eagle, the flapping-wing machine takes off virtually from a standing start. The pilot revs up the tiny gas engine. The wings rise, then beat down—and the first man-bearing mechanical bird hops into the air. After a few fast flaps, the pilot finds a warm updraft, sets the wings rigid and the ornithopter, now a great soaring bird, glides aloft.

Back of that human-bird flight is man's perennial quest for wings that neither the fast, impersonal speed of the modern plane nor the slow, rigid hovering of the helicopter ever satisfied. From the ancient Greek legend of Daedalus, who fitted feathered wings on his own arms and those of his son Icarus, up till Stolzenberger's vibration-driven wings, inventors had tried to develop personal wings that would use the muscles in a man's arms and legs for flying.

Leonardo da Vinci, the great Italian artist, probably came closest to success along this line with his design for a man-powered ornithopter in 1490. Lack of exact knowledge of just how beating wings actually do sustain flight and lack of a sufficiently light powerplant to substitute for man's weak muscles, stymied Da Vinci and succeeding inventors.

A significant clue to flapping flight, though, turned up in Europe before World War II and helped Stolzenberger in his vibration flight tests. Pilots of German gliders found that on windy days the craft that had semi-flexible wings did a lot better than those with firmly braced wings. Alexander Lippisch, a leading German air scientist, put forward the theory that the slight *flapping* of the flexible wing gliders was the cause of their superiority over the rigid type. A crack soaring pilot himself, Stolzenberger made the most of that hint in working out his bird models.

Probably even more than the rest of us would-be birdmen, Stolzenberger hopes to be the first human to soar aloft like a bird. He has the gliding skill and the good physical balance and coordination to do an expert job of flying a flapping-wing craft. You can see in this article how such a dream machine will really work. Of course, there are a few details yet to be added and a technical bug or two still to be licked before you can fly.

One day soon, after the last little bug is wiped out, you may be able to buy a flapping aircraft. Then you can step into your backyard, climb aboard the little machine and realize that age-old dream of man: *Flap your wings—and fly off into the blue.* •

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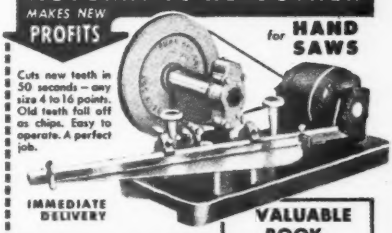

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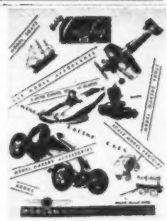

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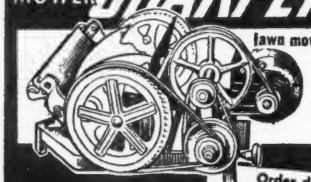

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Our Business Is Pottery

[*Continued from page* 70]

upper East Side and get a terrific kick every day from selling the pottery we've made with our own hands.

Making pottery of our own design didn't come naturally. We'd never given a thought to making anything but money.

It all began after both of us had left the Army. Arthur, the lawyer, had done legal duty with Chemical Warfare and Herman, the personnel director, had served with the Air Corps. Though Arthur was carrying on a practice established by his father, a New York Supreme Court judge, the idea of working in the legal field permanently had no appeal for him. Herman, for his part, was fed up with all the red tape in his government work. He chucked his good desk job and tried selling books in a New York store. He was still restless, though, and wanted to be his own boss.

Both of us decided to figure out some interesting new way to make a living and like it. Arthur's sister suggested pottery—and that got us curious about how a potter could turn out a finished dish from a clod of clay.

To discover the potter's secret, we spent one summer in the Ceramics School of the University of New Hampshire studying with two fine instructors, Edwin and Mary Scheier. From that point, there was no turning back. Our business was going to pottery—but fast!

We returned to New York and found a two-by-four room over a taxi dancehall on Broadway. To the accompaniment of the wailing saxophones below, we experimented month after month with clays, glazes and pottery shapes.

We went regularly to the Museum of Modern Art in New York, where Albert Jacobson gave us some invaluable pointers on glazes. From school, we'd rush back to our miniature pottery works over the swaying taxi dancers and turn out saucers, cups and vases.

Up to this point, we had been using Monmouth-type clay from Illinois. It was a high-firing, white clay that gave us good results but did not yield the exact color effects we wanted. We tried our luck with New Hampshire clay, a lower-firing, red clay we picked up through the Tony Smith Digging Company. Tony is a 13-year-old nephew in New Hampshire who sent us burlap bags full of his diggings.

We carefully made up our first batch of vases from the new red clay and baked it in the kiln. When we opened the furnace door, we nearly had heart failure. Every piece was ruined, melted into a hopeless mass! We didn't know then that we could go over 2000 degrees Fahrenheit with that Monmouth clay—but not with the New Hampshire.

Then followed more weeks of trial—and failure. We mixed the New Hampshire type with other clays, fired the mixture at lower temperatures. At last we hit the combination.

We were in too deep now even to consider backing out. There were more frustrating, heartbreaking days when everything seemed to go wrong. The different glazes would turn temperamental. We couldn't get the right shade of color. The equipment developed one kink after another. Almost every day we had to call the electrician and beg him to rush first aid to our ever-dying kiln. Those delicate heating elements in the kiln seemed to break right before our eyes, out of sheer cussedness.

More than once we were tempted to junk the whole business. We kept at our risky venture, though, for a year. Finally, we decided to take our chances and tackle the pottery trade. We showed our handmade creations to three gift shops. Soon we had more orders than we could supply.

After months of filling store orders, we felt we were ready for the next stage—our own shop. We had the essentials—a potter's wheel, two kilns, a supply of clay, a damp box (an old icebox) for storing any products temporarily before reworking and firing, a spray booth, some valuable experience with glazes—and a million dollars' worth of enthusiasm.

Everyone had warned us that we had to lose money—if not our shirts—for at least a year. We were ready to face hard times. After three more months of experiments, we finally opened our shop in October, 1948. In a few weeks, we were so mobbed that we had to hire two girls to help out in the pre-Christmas rush. The public's reaction was wonderful—and so was our own. In our first six months, we grossed an average of $800 a month—and word-of-mouth advertising is bringing in more eager customers all the time.

Most people say that what they like about our pottery is its hand-turned appearance and the unconventional glazes we stress. We've avoided the usual patterns and done our best to make fine, elegant stuff instead of thick, weighty wares. We've had Europeans dropping in to examine our products too. They're surprised that here in East 58th Street we're turning out pottery that looks as though it had come from the Continent.

If you want to make pottery your career, spend a few months at school. Then start experimenting on your own with glazes, clays and pottery shaping. A good wheel will cost you $150 to $250. A kiln will run from $50 to $500, depending on the size and quality. Buy the best you can afford.

At first, buy commercial glazes so you can concentrate on other phases of ceramics be-

[*Continued on page* 160]

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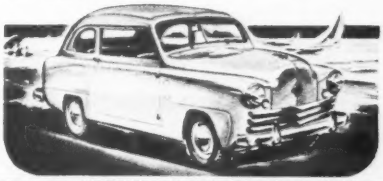

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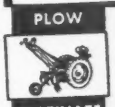

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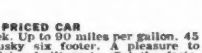

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Our Business Is Pottery

[*Continued from page* 159]

fore getting involved with complicated chemical formulas. When you start making up your own formulas, check every chemical you use and tackle only one formula at a time. You can buy commercial clays, too—but don't try to compete with the manufacturers who turn out thousands of the same pattern. They can do the job better, cheaper and more quickly. Your best bet is to create something which at least *looks* original.

Big New York stores want to take all the pottery we can produce, and sell it at twice the prices we charge in our shop. Wholesalers would like to distribute our ceramics nationally. But to accept such offers would be running a factory—just what we want to avoid. So we shake our heads and say, "Sorry."

We're not the least bit sorry, though, that we gave up our careers to gamble in clay. It's a rare and wonderful feeling when you create something attractive from a shapeless batch of clay and hear the customers clamoring for your creation. We're happier in our work today than we've ever been before—*all because we wanted a real kick out of life and let our business go to pottery.* •

Highway Hawkshaws

[*Continued from page* 75]

sergeant from headquarters, who was a trained criminologist, was waiting to give the car a going over. A single hair was found in the grille work, a blood spot on the bumper. Within a few hours at the laboratory, the hair and blood were conclusively proven to have come from the victim. The motorist pleaded guilty.

Today, the evidence of the scientific laboratory may be far more accurate in pointing out a guilty driver than a dozen eyewitnesses. The comparison microscope, the test tube and other lab apparatus come up with only one answer—and it's invariably the correct one. From then on, it's simply a question of apprehending the hit-and-run driver.

"There's no such thing as a case without clues," says one of the most famous highway sleuths. When a speeding car strikes a person, something must give. It may be part of the car or part of the victim—but two objects just can't occupy the same space at the same time.

Whatever it is, the highway hawkshaws will pick the clue up. And with dogged persistence backed by scientific crime labs, they'll follow it right to the door of the hit-and-run criminal. •

Fire—Origin Unknown

[*Continued from page* 154]

been using to examine a collection of rare coins on a window sill. The glass fell from the sill onto the roof and slipped into a copper gutter in such a way that it focused the sunlight on dry cedar shingles. They soon burst ablaze from the concentrated rays.

Near Trinity Center, Calif., a grazing horse swished his tail at a fly. He apparently missed the fly but hit a low-hanging high-tension wire. That tail of the electrocuted horse caught fire and started a 55-acre forest fire.

In Indiana, a farmer tossed a stick at a pig. A nail at the end of the stick struck a stone and the resulting spark set fire to a haystack. In Mississippi, a sparrow picked up a lighted cigaret butt, carried it to her nest, and thus burned down a warehouse.

No one can spend his entire life worrying about obscure fire hazards as these. But everyone, when he knows the tricky nature of fire, can do something to eliminate things that help them start.

A clean cellar is the most important thing, for here is where a third of all residential fires start—in the piles of old beds, rags and rubbish that "might come in handy some day." Cellar cleanup campaigns have cut home fires in half in many communities.

The fire department also would love you if you'd keep all flammable liquids away from the house—and do your domestic dry cleaning outdoors. Throw away your old paint rags and newspapers, and get your floor sweepings out of the house as soon as possible. Oil mops, polishing rags, while essential to good housekeeping, can be kept impotent as a source of spontaneous ignition if they're stowed in metal containers with lids. A little common sense goes a long way toward fire prevention.

And if you're faced with a fire you couldn't avoid, common sense and a cool head will work wonders. Take a lesson from James Gray, a 59-year-old Bronx resident who was shaving himself in the kitchen of his home one cold winter morning last year.

He stepped away from the mirror to admire his handiwork and accidentally backed into a red-hot coal range. His pants caught fire immediately, but Mr. Gray sensibly rushed outdoors and extinguished the blaze by sitting in a snowbank. Neighbors who heard his cries summoned the Fire Department. By the time the engines arrived, though, the fire was out and pantsless Mr. Gray was ready for medical attention.

Keep cool like that—and your Fire Department will never have to put down in their books the tragic epitaph for your charred remains: *"Fire—Origin Unknown."* •

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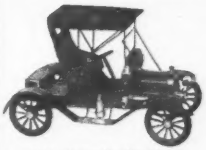
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MI Tests the '49 Pontiac

[*Continued from page* 83]

about as most cars have had it for some time.

The fuse box below the dash is a nice wrinkle. It's readily accessible behind the steering post, all the fuses are marked and easy to reach, and there's even a spare. I can hear some of you readers mumbling, "He calls that a feature!" Very few motorists know where their fuse box is or even if they have one! It's nice to know where it is just in case you blow your headlights while crossing the Rockies some stormy night.

The car I selected for my road test was the four-door 8-cylinder Chieftain De Luxe sedan. This was delivered to me in Los Angeles and I kept it for two days. I prefer Southern California over any other section of the country for car testing because of the extreme variety in driving conditions within a few miles.

The Pontiac I was driving was equipped with Hydramatic drive and when I pulled away from the curb in downtown L. A., it was nice just having a gas pedal and brake to contend with. It was stop and start for miles. Once clear of the city, I headed for the mountains and was impressed with the way the car held the curves and hugged the road as I started to climb. This Pontiac has a real big-car feel both in power and roadability.

The engine of the 8-cylinder car develops 104 hp. This gives it excellent pickup and flexibility even on tough grades. Many miles of mountain and canyon travel thoroughly convinced me that this was truly a good, rough and tough piece of iron. So, I headed for the ocean highway for some flat surface runs. But when I reached the ocean it was getting dark so I called it quits for the night.

In checking my notes that evening, I found several observations that might prove worth noting. These new Pontiacs are much wider inside than before and they are extremely comfortable to drive. They handle rough, unpaved roads well.

I was up before dawn the next morning and as soon as breakfast was over I headed for the deserted parts of the ocean highway. On one piece of road I had previously marked off quarter, half and mile stretches. So, with the highway to myself the test was really a pleasure. Here are the averages from at least six runs on every test: zero to 60 mph with Hydramatic drive—15.1 seconds; 10 to 60—13.7 seconds (10 to 60 in Hydramatic is like starting the run in second in a car equipped with conventional transmission); 30 to 60—10.4 seconds. That will give you some idea of the speed and flash the new Pontiac has.

[*Continued on page* 164]

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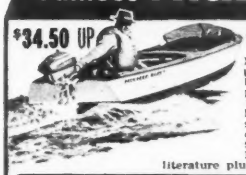

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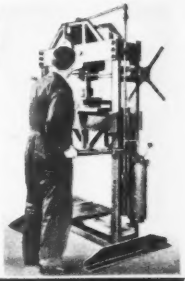

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MI Tests the '49 Pontiac

[*Continued from page* 162]

Top speed was around 86 mph. The job has all the punch anyone could want in a general, family-type car.

Sixty-five mph should be the top continuous cruising speed for these cars. They'll go much faster but on long hauls I think you'd be asking for trouble if you cruised them any faster. This opinion is based on that personal survey I made recently to determine breakdown causes on the Pennsylvania Turnpike.

I rate the 1949 Pontiac right at the top as to value in its price bracket. This is a rugged, excellent-performing car. It's comfortable and, by today's poor standards,. it has good steering characteristics. The Pontiac will prove reasonable to service and it should give thousands of untroubled miles if cared for properly.

I like the car and would heartily endorse it to my best friend—if it suited his needs for a family car. One factor in Pontiac's favor which is becoming increasingly important each day is its resale or trade-in value. These cars hold their value as well as any car in the medium range—and better than most. And that's something to think seriously about when buying a new buggy these days. •

MI Tests the '49 Dodge

[*Continued from page* 85]

a 103-hp, six-cylinder job called the Get-Away, definitely has more wallop than earlier models. When I lifted the hood, to me it looked just like the old Chrysler "70" except for the air cleaner. But on closer scrutiny I found plenty of changes. The '49 version has what the boys in the race business call a reprofiled camshaft. This opens the valves faster and allows them to close quicker. It also sports a newly designed cylinder head that has boosted the compression ratio to 7.0 to 1. Both the manifolding and the carburetor have been redesigned for faster throttle response. The Coronet is no race car but it has lots more zip than former Dodges.

On the toughest grades I found her performance right up with the best. She clung to the road like a leech on sharp turns. The way this Dodge handled and felt on the road reminded me of my old '48 Mercury, which was odd, because the suspension of the two cars is entirely different. The Dodge has independent front-wheel coil springing and Hotchkiss drive as against the torque tube and the old Ford suspension of the Mercury.

Regardless, the Dodge did feel like my Mercury. That's a tremendous compliment,

[*Continued on page* 165]

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[*Continued from page* 151]

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MI Tests the '49 Dodge

[*Continued from page* 164]

too, as the '48 Mercury was a great road car and already is becoming a collector's item. Part of the reason may be the new "sea-leg" shock absorbers used on the Dodge to overcome lateral and vertical motion. This type of suspension makes the car more rigid—a big help in hugging the road. Also, on the straight stretches, the Dodge handles well in passing other cars and there is no exaggerated sway as you cut out fast to move ahead.

On the straight runs I found the car a real pleasure for several reasons. First, the seats are the best I've found in the new cars. There is ample leg room but the payoff comes in the seat structure itself. Dodge calls the seats "knee level," and this is comfortably true. The pitch is such that your weight, instead of falling all on your posterior, is distributed along your legs to the underside of your knees, as in a really good chair. Your knees are not up around your chest but out straight as they should be.

I made a number of speed runs with two different cars, both 123½-inch-wheelbase Coronets. These cars had the Dodge Gyrol fluid drive, not the new Gyro-Matic transmission now available as an extra. The Gyro-Matic is similar in action to other automatic transmissions except that you still have a clutch pedal for reverse and extra-low low.

Here are my findings, based on averages of many runs: 0 to 60 mph through gears, 17.8 seconds; 10 to 60 in high, 19.9 seconds; 30 to 60 in high, 11.9 seconds; top speed, 84-86 mph. All my speed runs were made in clear weather on a windless day in the San Fernando Valley, Calif., at less than 500 feet above sea level.

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[*Continued on page* 166]

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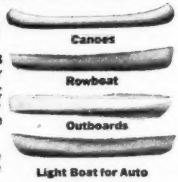

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MI Tests the '49 Dodge

[*Continued from page* 165]

dianapolis race if you own a Dodge. But they do show that the Dodge has plenty of snap and punch.

These new cars are three inches narrower outside but six inches wider inside (58 inches on the seat cushions in front and 58¾ inches in the rear) than last year's line of Dodges. Even for guys built like me, 58 is plenty of seat width. If this trend for wider cars keeps going, in a few years an eight-lane highway may look like a cowpath.

The model that interests me most, though, is the new open roadster scheduled for early summer production. This will be the first open car built in this country in many years, and I feel there's a great market for it. It seems quite natural that it should be brought out by the Chrysler Corporation, for a little, open roadster was the sire of all Chrysler products. Without that roadster the name Chrysler might have meant no more in the automobile world than the name Schmaltz.

After World War I, open cars became as passé as they are today. By 1924 an open roadster was considered a relic of the Dark Ages. It was in that year that Walter P. Chrysler placed his whole stack of chips on a completely revolutionary automobile, the Chrysler 70.

This car was one of the biggest single advances ever made by an American automobile manufacturer. The roadster was the backbone of his line. In 1924 Chryslers were far more radical than the Tucker would be now.

When the Chryslers hit the street in '24, they were the first mass-produced cars in America to have four-wheel hydraulic brakes, short-stroke, high-speed engines and small wheels plus balloon tires.

Automobile men across the country said that the high-speed Chrysler engines would burn up in 10,000 miles and that the hydraulic brakes were the most dangerous things since the invention of the razor. The 70 roadster, which sold for less than the price of a Plymouth today, also was the first car to have two-toned paint jobs, indirect instrument board lighting, parking lights and a dash temperature gauge. The car was equipped with real leather upholstery and the paint was one of the very first Duco jobs. In all, this roadster offered about the greatest money value in an automobile this country has ever experienced. In quality, no car at any price topped it.

Incidentally, this was the first car in which I ever ran a test. The auto belonged to Dick

[*Continued on page* 168]

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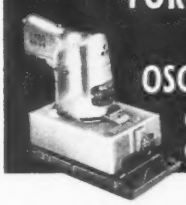

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MI Tests the '49 Dodge

[*Continued from page* 166]

Decker, vice-president of Sheffield Farms, who died a few years ago. Decker was a great car fan and the Chrysler 70 was advertised as the fastest American car—the 70 meaning it would go 70 mph. He wanted to find out if the 70 would live up to its name. In those days 45 was a hot speed. I finally got Decker's 70 up to 72 mph, an unheard of speed 25 years ago for a stock car—and also for me.

This original Chrysler 70 swept the country. It became *the* car to own and the sportiest on the road. And so this little roadster became the foundation for today's "Big-Three" Chrysler Corporation.

To get back to our current test, the Dodge ram's head on the hood about sums up the '49 model: It's tough, rugged and sound. A dependable auto, the Dodge is easy to drive, easy to ride and easy to look at. It's also excellent on hills and handles well on fast stretches. The regular '49 Dodge line should hold a real resale value. Personally, the number I'm really eager to see is that new Dodge roadster. Should be quite a car. •

Home Needs 50 Keys

[*Continued from page* 156]

reinforcing around these openings, and by installing diagonal stiffeners.

18. Windows. These are delicate, so they must be carefully installed. If too tight, they'll stick; if too loose, they'll raise unevenly and jam. Loose stops cause rattling. Casement windows, which usually have level sills, should be checked for watertightness. Permanent weatherstripping should be installed to reduce heating costs. Hastily attached weights and balances may later jam, requiring costly repairs.

19. Doors. Some builders use undersized doors. You can walk through an 18-in. door, but can you drag a sofa with you? As a general rule, be content with nothing less than 30-in. openings.

20. Sheathing. This gives strength to walls, provides a base to which the siding is applied, and furnishes a certain amount of insulation. Sheathing may be boards (laid horizontally or diagonally), plywood, or a rigid insulating material. Insulation board, in 2x8-ft. sheets or larger, provides the same stiffening value as ordinary lumber.

21. Building Paper. Between the sheathing and siding goes a good-quality building paper, providing a waterproof, windproof, and dustproof seal.

22. Siding. Wood siding must be decay resistant, seasoned, and able to take and hold quality paint. Cedar, white pine, and Ponderosa pine are best. Butt joints should be sealed. Nails should be driven through the sheathing into the studs and should have their heads set and puttied. Both faces of the siding should be prime-coated on a quality job to prevent decay from the inner moisture.

23. Veneer Walls. When brick or masonry is laid over a wood frame, an air space should exist between the material and the wood sheathing to drain condensation. Brick walls should be tied to the frame with metal clips about 16 in. apart. Brick veneer requires a thick foundation wall, as shown in the drawing of our typical composite house. Openings in masonry walls must have heavy steel or wood lintels bridging the tops to support the walls as they continue on up.

24. Chimneys. Each chimney should be a self-supported structure, independent of the house frame. A stone cap on top sheds water, preserving the masonry below. The flue lining should extend above the cap. The chimney itself should extend above the roof ridge about 30 in. to prevent eddying air currents from going down the flue. The house roof, floors, and walls should be framed around the chimney, leaving 2 in. of space in which fireproof insulating material is packed. The chimney footing should be at least 12 in. deep and 6 in. wider than the chimney.

25. Fireplaces. If a fireplace is included, it should have a separate flue. The flue area should be no less than one-tenth the area of the fireplace opening. The back of the fireplace should be narrower than the front for good reflection. Firebrick must be used throughout. The iron throat and damper should extend over the entire width. A smoke shelf should run the full width of the iron throat to deflect downdrafts.

26. Porch. If you have a porch, its joists and roof should fasten to the house frame and its foundation should tie in with the house foundation. An open porch must have a slight pitch to drain water and snow.

27. Rafters. They form the frame of the roof and must be of adequate size and strength to carry their load of ice and snow. Undersized or widely spaced rafters will let the roof sag.

Next month we'll finish the story of our composite house by describing its interior finish; plumbing, heating, electricity, etc. •

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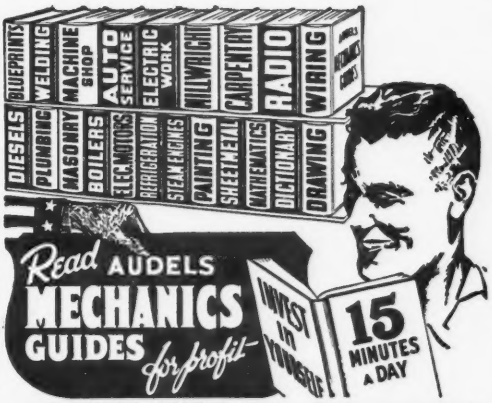

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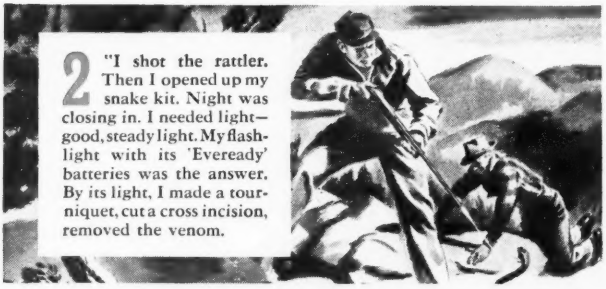

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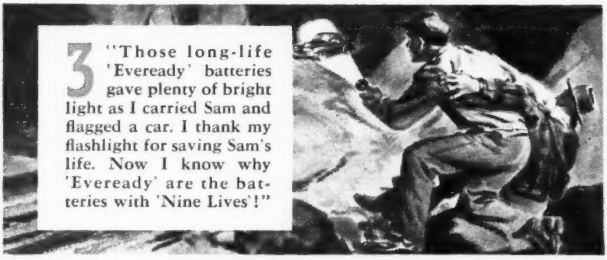

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